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EFFECTS OF ABILITY GROUPING IN SCHOOLS RELATED TO INDIVIDUAL DIFFERENCES IN ACHIEVEMENT-RELATED MOTIVATION, FINAL REPORT.

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MICHIGAN UNIV., ANN ARBOR

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TWO EMPIRICAL STUDIES WERE MADE TO TEST THE DESIRABILITY OF EMPLOYING SOME FORM OF ABILITY GROUPING TO ENHANCE LEARNING OPPORTUNITIES IN SCHOOLS. THE TWO FIELD STUDIES SPECIFICALLY EXPLORED SOME OF THE MOTIVATIONAL IMPLICATIONS OF ABILITY GROUPING AS MANIFESTED IN SCHOLASTIC ACHIEVEMENT, REPORTED INTEREST IN SCHOOLWORK, AND THE DEVELOPMENT OF REALISTIC VOCATIONAL ASPIRATIONS AMONG STUDENTS WHO DIFFER SUBSTANTIALLY IN THE NATURE OF THEIR MOTIVATION TO ACHIEVE. STUDY A WAS UNDERTAKEN TO EXPLORE SOME OF THE POSSIBLE CONSEQUENCES OF PARTICIPATION BY WELL-QUALIFIED, JUNIOR HIGH SCHOOL STUDENTS IN SPECIAL SECTIONS OF MATHEMATICS BEGINNING IN THE SEVENTH GRADE. STUDY B WAS CONCERNED WITH THE EFFECTS OF HOMOGENEOUS ABILITY GROUPING IN THE SIXTH GRADE. HERE, SCHOLASTIC ACHIEVEMENT AND REPORTED INTEREST IN SCHOOLWORK WERE MATTERS OF CENTRAL INTEREST. THE HYPOTHESIS THAT ABILITY GROUPING WOULD PRODUCE GREATER AROUSAL OF ACHIEVEMENT-RELATED MOTIVATION THAN THE TRADITIONAL CLASS THAT IS HETEROGENEOUS IN ABILITY WAS NOT SUPPORTED BY STUDY A, YET WAS STRONGLY SUPPORTED BY STUDY B. (GD)

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THE UNIVERSITY OF MICHIGAN

COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS
DEPARTMENT OF PSYCHOLOGY

Final Report

Effects of Ability Grouping in Schools Related to Individual Differences in Achievement-Related Motivation, FINAL REPORT

JOHN W. ATKINSON
PATRICIA O'CONNOR

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Related to Individual Differences in
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John W. Atkinson and Patricia O'Connor

Errata

1. Page 27, Table 2.3. The number of boys scoring in the lowest third on 9th grade n Achievement should be "27" and not "28".
2. Page 48, line 28. The second word should read "more" and not "less".
3. Page 48, last line. Delete the last word "cut".
4. Page 78, first line of last paragraph. Change "measure" to "measured".
5. Page 97, second line of second paragraph. Change "As" to "An".
6. Page 100, first paragraph. The value of X^2 should read "14.58" instead of "14.48".
7. Page 109, last sentence. Change "anticipated" to "unanticipated".
8. Page 113, Table A.1. Under girls, the heading for the last row should read "High - Low" instead of "Low - High".
9. Page 143, Table B.6. Columns lacking headings should be labelled "N".

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COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS
Department of Psychology

Final Report

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John W. Atkinson
Patricia O'Connor

ORA Project 04615

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FOREWORD

The research reported herein was supported through the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare. This represents the final report on Contract No. OE-2-10-024 (July 1961-December 1962).

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CHAPTER 1

INTRODUCTION

The desirability of employing some form of ability grouping to enhance opportunity for learning in the schools is a question of current interest and controversy. The present investigation consists of two field studies undertaken to explore some of the motivational implications of ability grouping as manifested in scholastic achievement, reported interest in schoolwork, and the development of realistic vocational aspirations among students who differ substantially in the nature of their motivation to achieve.

Advocates of ability grouping often argue from general observations that the heterogeneity of ability represented in the traditional, unselected class provides a situation which very often bores the student of exceptionally high ability because he is insufficiently challenged, and one which often leads to discouragement and apathy in the student of low ability because he inevitably finds himself incapable of meeting the standards set by his more able peers. If the argument is correct, a class in which the full range of individual differences in ability is represented would seem less than an optimal condition for learning for many students. It is generally assumed by proponents of ability grouping that one important consequence would be a general spur to the motivation of most students.

Those who take a negative view of grouping students so that there is homogeneity in ability within a class sometimes tend to minimize the issue of achievement and to emphasize, instead, some of the potentially undesirable social consequences (e.g., the establishment of an intellectual elite, snobbery, etc.) which appear inconsistent with egalitarian values.

The question obviously has many sides. Equally obvious is the need for more and better empirical information related to the various arguments and suppositions which now enter into decision-making concerning this problem. The impetus for the present explorations of some of the motivational implications of ability grouping was provided in part by the desire of teachers and school officials in a midwestern city to learn something about the consequences of their own experimental programs in ability grouping. But interest in the problem also stems from some of the implications of recent research on achievement-related behavior and, in particular, a theory of achievement motivation which has evolved in experimental and societal studies (see McClelland, *et al.*, 1953; Atkinson, 1958; McClelland, 1961).

There is much in contemporary research on the effects of individual differences in achievement motive (n Achievement) and Test Anxiety (Sarason, *et al.*, 1960) to suggest that ability-grouping should enhance motivation for school-

work in some, but not necessarily all students. The present research attempts to take advantage of the opportunity afforded to study effects on achievement-related motivation in two ability-grouping programs employing techniques and guiding hypotheses that have served to provide some clarification of the factors which influence achievement-oriented behavior in fairly well-controlled experimental conditions.

Since the general questions explored in this research are derived from a theoretical conception of achievement motivation evolved in experimental studies, we shall first review the general results of this earlier work and present, in outline, the theoretical conception. Then the application of several guiding hypotheses to the problem of ability grouping will be spelled out. Finally, the general plan and purpose of two studies reported in subsequent chapters will be presented.

A Theoretical Conception of Achievement Motivation

Academic achievement is generally believed to be the result of both ability and motivation. The intelligent child who is interested in schoolwork and who also takes pride in doing his best will achieve more in school than the less intelligent child or one who shows little interest in learning. Quite a bit is known about the influence of different kinds of ability on academic achievement because tests of ability have been available for many years. Much less is known about how motivation influences achievement in school because adequate and standardized tests of motivation have not been generally available.

In the past decade, several promising tests of individual differences in motivation related to achievement have been developed. These tests are clearly in a very early developmental stage compared to contemporary tests of intelligence and specific abilities and are not yet adequate for the purpose of predicting about the behavior of individuals. But they are sufficiently reliable to allow meaningful studies of how differences in motivation influence the performance of groups of persons classified as comparable in motivation.

One of these tests, developed by McClelland, et al. (1953) measures the strength of the need or motive to achieve (n Achievement). This is a tendency to take pride in one's work which instigates attempts to perform well whenever competence is evaluated in relation to some standard of excellence. The work of McClelland, et al. (1953) shows that individual differences in strength of achievement motive can be assessed by means of a reliable content analysis of imaginative stories produced in response to picture stimuli presented in a group test situation. The n Achievement score, which provides

the measure of strength of achievement motive, represents the frequency with which an individual introduces imagery having to do with concern over performing well in relation to some standard of excellence into imaginative stories he writes in response to certain pictures or verbal cues. Table 1.1 compares the imaginative stories of one boy described as strong in achievement motive because he tends to introduce a great amount of imagery indicative of concern over achievement and another boy described as low in n Achievement because his story shows an absence of this type of imagery. The n Achievement score is based on a series of such stories obtained from each subject. A detailed manual explaining how the content of a story is analyzed to produce a n Achievement score is presented in McClelland, et al. (1953) and Atkinson (1958).

TABLE 1.1

Comparison of Imaginative Stories Written About a Boy in a Classroom
to Illustrate the Empirical Basis for Inferring
Strong and Weak Motives to Achieve

Strong n Achievement

Bob is in a math class and feels very confident because he got his homework done. A few days ago Bob wasn't doing his homework and was lagging behind the rest of the class. His teacher talked to him and told him he must work harder if he wants to do well in junior high. So now he is working hard! He is thinking about his teacher and is glad he took her advice. He hopes he can bring up his grades before the last marking period. He brings up his grades so much that he is honored by the teacher.

Weak n Achievement

He is talking to his friend next to him. The teacher stood up and walked over to them. She tells them to be quiet and get back to work. The teacher assigned some work to them. They start but find out it is a hot day and work is boring. He is thinking how nice it would be to be out playing baseball. The teacher will tell the class that it is a hot day so they can have a recess if they have their work done. The boy does not, and so he works until he finishes it.

In recent years, the relationship between studies of effects of n Achievement and another set of research findings employing a test of individual differences in anxiety experienced in achievement test situations has been more fully appreciated (Atkinson, 1960). A measure of Test Anxiety, first developed

by Mandler and Sarason (1952), provides an assessment of the tendency to be anxious about failure in achievement situations. This tendency, called Test Anxiety, generally tends to interfere with efficient performance of complex intellectual tasks when there is external pressure to achieve. The test itself is a self-report questionnaire which gets at often experienced symptoms of anxiety in achievement-test situations. Sarason (1960) has recently reviewed a program of research on anxiety in elementary school children.

A substantial number of experimental studies have been conducted with college students using the tests of n Achievement and Test Anxiety. The results show that when the motive to achieve is strong, the individual finds tasks which require skillful performance attractive; he tends to be realistic in setting his level of aspiration somewhere between what is obviously very easy and obviously too difficult to accomplish; he tends to put forth a lot of effort to perform well and is persistent in his attempts to succeed at tasks requiring ability (Atkinson, 1958). However when "Test Anxiety" is strong, the individual tends to be more unrealistic in setting his level of aspiration. He more often tends to focus on either very easy tasks or to attempt tasks that are clearly too difficult for him rather than those of intermediate difficulty which are favored when motive to achieve is strong. Furthermore, Test Anxiety tends to interfere with efficient performance of achievement tasks and reduces persistence at achievement-related activities. It appears that this tendency may be considered a motive to avoid failure, which, if very strong, makes achievement-related activities threatening to the person and produces behavior that tends to inhibit or dampen realistic efforts to achieve. Results have shown the two motives to be generally uncorrelated among male college students (Atkinson and Litwin, 1960; Mahone, 1960).

The theoretical conception which has provided a meaningful integration of many of the experimental findings concerning n Achievement and Test Anxiety is essentially a refinement and extension of the resultant valence theory of level of aspiration advanced earlier by Lewin, Escalona, and Festinger (see Lewin, *et al.*, 1944). We shall briefly review the conceptual scheme, since it provides the guiding ideas for our studies of effects of ability-grouping. [The theory is presented in detail elsewhere (Atkinson, 1957; 1958, Ch. 22).]

Any situation which offers the possibility of feelings of success as consequence of good performance also presents the possibility of feelings of failure for poor performance. In the simplest case, then, achievement-related behavior is always a resultant of the tendency to seek success (T_s) as multiplicatively determined by three variables—the strength of motive to achieve success (M_s), the expectancy (or subjective probability) that success will be attained as a consequence of action (P_s) and the incentive value of success at the particular task (I_s), whatever it may be. From Lewin, *et al.*, we borrow the assumption that the incentive value of success is greater the more difficult a task appears to the person. But since the apparent difficulty of a task will be great when the expectancy (or subjective probability) of success is low, we can state the basic assumption this way: $I_s = 1 - P_s$ where P_s

is the measure of the strength of expectancy of success.

Figure 1.1 shows the main implications of this conception: the strength of the tendency to achieve success is greatest for tasks or actions having intermediate probability of success; strength of tendency to achieve success is greater the stronger the motive to achieve; and the differential in strength of tendency that is attributable to differences in strength of motive is greatest when probability of success is intermediate.

We view the determinants of the tendency to avoid failure in a symmetric manner. The incentive value of failure, that is, the potential humiliation and embarrassment of failing is greater the easier the task. We state the assumption this way: $I_F = -P_S$. Figure 1.2 shows the implications of our conception concerning strength of tendency to avoid failure by not performing actions which might lead to failure. Figure 1.2 says that the strength of avoidance (or anxiety about failure) will be greatest when P_S is intermediate and greater the stronger the motive or disposition to avoid failure.

If both tendencies are always activated in achievement situations, the resultant motivation will be an algebraic summation of approach and avoidance tendencies and will depend upon the relative strength of motive to achieve success (M_S) and motive to avoid failure (M_{AF}) in the person.

Figure 1.3 shows the resultant achievement motivation when $M_S > M_{AF}$; Fig. 1.4 shows resultant achievement motivation when $M_{AF} > M_S$. In this latter case, resultant motivation is invariably avoidant and most strongly avoidant when P_S is intermediate. This means that the person is not positively motivated to perform any achievement task—no matter what the level of difficulty—unless he is constrained by other sources of positive motivation which are sufficient to overcome the resistance, or tendency to inhibit performance, which we identify with the strength of his tendency to avoid failure.

We assume that even in simple experiments, and certainly in real-life situations, there are always other extrinsic sources of positive motivation such as the desire to gain approval by doing what is generally expected. We thus assume that the total strength of motivation, which is expressed in overt choices and performances, equals resultant achievement motivation plus extrinsic positive motivation.

Figures 1.5 and 1.6 show the effects of adding a constant amount of positive extrinsic motivation to the resultants already presented in Figs. 1.3 and 1.4. Note particularly that the addition of a constant amount of extrinsic positive motivation is likely to be sufficient to overcome the strength of avoidance at very easy and very difficult tasks but not at tasks of intermediate difficulty when $M_{AF} > M_S$. Figures 1.5 and 1.6 provide the basis for the prediction that preference for intermediate risk (or intermediate aspiration) will be greater the greater the strength of resultant achieve-

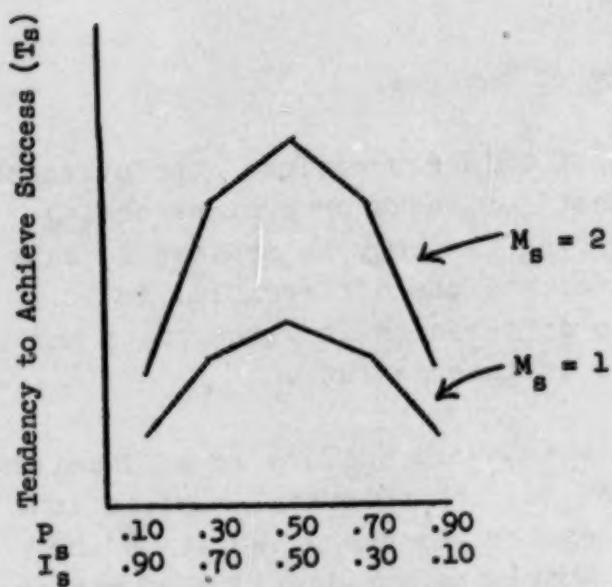


Fig. 1.1. Tendency to achieve success = $M_s \times P_s \times I_s$. $I_s = 1 - P_s$.

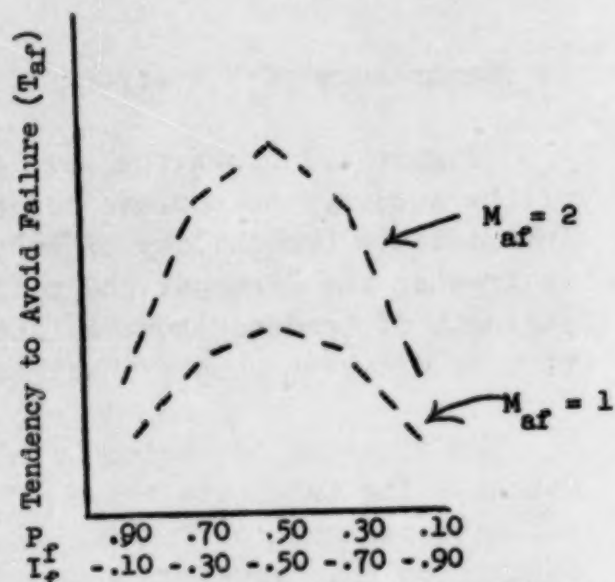


Fig. 1.2. Tendency to avoid failure = $M_{af} \times P_f \times I_f$. $I_f = -P_s$.

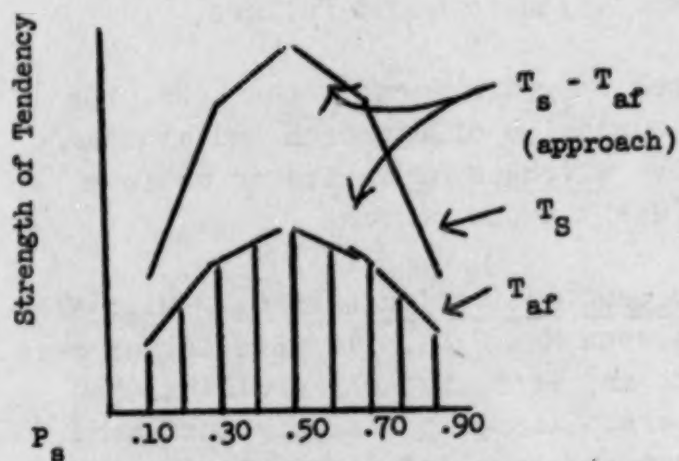


Fig. 1.3. Resultant achievement motivation = $(T_s - T_{af})$ when M_s is 2; M_{af} is 1.

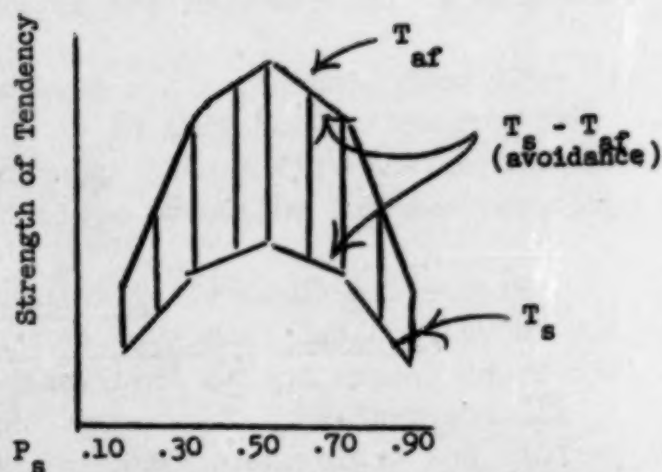


Fig. 1.4. Resultant achievement motivation = $(T_s - T_{af})$ when M_s is 1; M_{af} is 2.

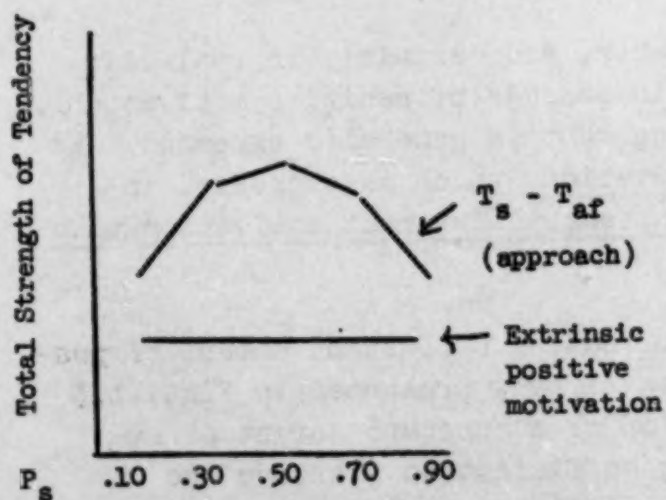


Fig. 1.5. Total motivation = $(T_s - T_{af}) +$ extrinsic motivation when $M_s > M_{af}$.

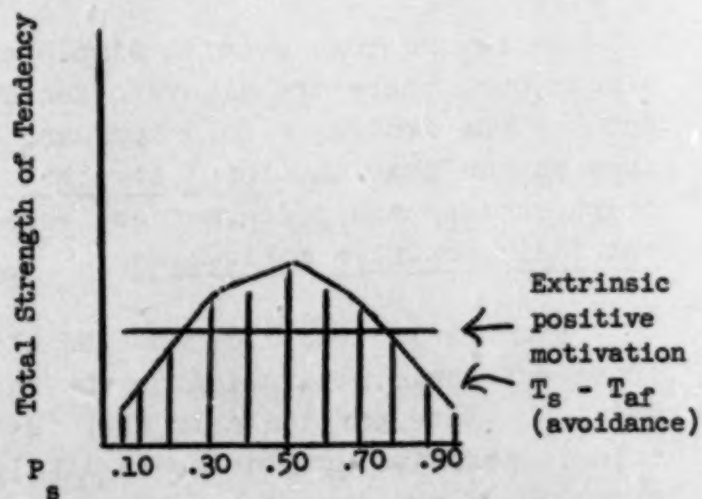


Fig. 1.6. Total motivation = $(T_s - T_{af}) +$ extrinsic motivation when $M_{af} > M_s$.

ment motivation. They explain why persons who are very strongly disposed to be anxious about failure will more often tend to set either a very high level of aspiration or a very low level of aspiration when given a choice between activities which differ in apparent difficulty. Both of these patterns of behavior are viewed as defensive avoidance of competitive achievement activity which reaches its peak (theoretically) where the probability of success is .50, as, for example, in a track meet between two equally skillful runners. Figures 1.5 and 1.6 also provide the theoretical foundation for the hypothesis that achievement-related motivation (both positive interest and anxiety) will be most strongly aroused in situations which provide intermediate degree of probability of success. It is in this type of situation, rather than one in which success is fully assured or nearly impossible, that we expect individual differences in strength of achievement-related motives to be most clearly manifested in overt behavior.

Application to Problem of Ability-Grouping

We make two assumptions in our analysis of motivational implications of ability grouping guided by this conceptual scheme. First, following the lead of ideas developed by Festinger (1954) in an analysis of social comparison practices, we assume that feelings of success and failure in day-to-day schoolwork are largely a consequence of evaluating one's own performance relative to the performance of others in the same class. This means that in the traditional class, which is heterogeneous in ability, the very intelligent child will almost always consider himself a standout performer and the least endowed child will almost never have this experience of success. Second, we assume that individual differences in intelligence probably represent the best estimate of individual differences in expectancy of success (e.g., of being a standout performer) which students bring to their schoolwork. According to the theory of achievement motivation, neither positive motivation to achieve nor anxiety about failure should be very strongly aroused in a student when the probability of success relative to peers is either very high or very low. This means, then, that achievement-related motivation is not likely to be strongly aroused for a considerable number of students in the class where all levels of ability are represented. It also implies that both positive interest in achievement and anxiety about failure should be more strongly aroused in a homogeneous, ability-grouped class. For when the student of high intelligence is surrounded by classmates of equally high endowment, his own expectancy of success (i.e., of being a standout performer) must be lower than when he is substantially higher in ability than most of his peers. Similarly, the less endowed student surrounded by peers of comparable ability now should find himself with an increased expectancy of success relative to his peers. For many students, then, homogeneous ability grouping should provide a competitive achievement situation more nearly approximating one of intermediate probability of success, or intermediate difficulty, than the traditional heterogeneous class. According to the theory of achieve-

ment motivation, both effort and anxiety should be more apparent when ability grouping is employed and both should be generally weaker when students of diverse abilities are members of the same class. Whether or not ability-grouping will enhance school performance or produce a decrement in performance should depend, then, upon the relative strengths of the motive to achieve success (n Achievement) and motive to avoid failure (Test Anxiety) within the individual student. According to theory, an increase in positive interest leading to enhancement of performance should occur for students who are highly motivated to achieve but weak in the disposition to be anxious when they are subjected to ability grouping. However, students who are more strongly disposed to be anxious about failure than motivated to achieve success may be less adequately motivated under a program of ability grouping than in the heterogeneous class. For in them, the arousal of anxiety may be substantially stronger than the arousal of positive motivation to achieve.

These guiding hypotheses, derived from a theory of achievement motivation, seem generally congruent with the impact of ability grouping on motivation suggested in a survey of comments from teachers who were reporting their own experiences in a junior high school ability grouping program which we studied. A selection of the comments follows:

Greater challenge for the more able students. Greater opportunity for the less able to experience success and achievement than would be possible if in classes with the very bright.

By narrowing the range of student ability in any one class, goals and objectives can be set which most everyone in a class can reach. Individual differences continue to exist, but are less pronounced than in a non-grouped class...results in less frustration for poorer students.

Some work of real consequence can be done with the gifted students. They are no longer bogged down by the dead wood of the others who need another type of program.

Able to cover more work. Not held back by people who have difficulty doing even average work. They like to work and volunteer as much as they are able to, and still not be labeled "the brains" in an average class.

Students feel challenged to perform, for many it is their first competitive experience. As they progress they stimulate each other, take pride in accomplishment and develop a better respect of mental power.

Emotional instability should be carefully regarded. Many teacher-student contacts should be made at the start of the year to be sure the student is developing confidence.... Students need to develop reasonable emotional stability under competitive conditions.

Insufficient leadership in other classes. Lack of motivation for some in average classes who do not have the better students to challenge them.

The regular classes sometimes lack the spark and enthusiasm which might have been ignited by accelerated students.

There are always several borderline cases in either "experimental" or the "average" group. Either they are not able to keep up with the group or they are considerably better than the group performance. Often this results in poor attitudes toward school. Also, it may involve dislike being labelled as "smart or fast group" or "slow group."

The teacher comments presented above are not uniformly consistent with our guiding hypothesis, but both increased challenge and heightened anxiety in some students are noted as observed consequences of ability grouping.

General Purpose of Two Empirical Studies

Beginning in the spring of 1959, two studies were initiated to explore some of the potential effects of ability-grouping on motivation. The first of these, Study A, was undertaken to explore some of the possible consequences of participation of well-qualified junior high school students in special sections of mathematics beginning in the 7th grade, followed by a systematic program of acceleration for qualified students in high school. At the time the study was initiated, plans were being made in the school to extend ability-grouping in the junior high school to other content areas—Social Studies and English. Study A examines both direct and indirect effects on achievement-related behavior. It considers achievement test scores obtained from 9th graders and subsequent academic achievement in high school. In addition, it considers questions pertaining to the development of realistic vocational aspiration suggested by the theory of achievement motivation. This, we felt, might be one of the less obvious consequences of a change in motivation produced by systematic exposure to ability grouping and the explicit emphasis on achievement beginning in some courses in junior high school. This study is equally concerned with effects on brighter students, who are selected for special courses and given opportunities for both enrichment and acceleration, and effects on the less bright students who are not selected for accelerated

courses. According to theory, the latter group of students should also experience a general heightening of achievement-related motivation as a consequence of the change in composition of their classes.

The second study, Study B, was also begun in 1959 and completed in 1962. This study profited in both design and execution from what the writers had begun to learn about the general problem from discussions with teachers and from an appreciation of some of the deficiencies of the first study. Study B is more focused in its intention. It is concerned with effects of homogeneous ability grouping in the 6th grade—a first experience with ability grouping for students in experimental classes. Scholastic achievement during the 6th grade and reported interest in schoolwork during the 6th grade are the matters of central interest.

Both studies are primarily concerned with the effects of ability grouping and the increased emphasis on achievement inherent in such a program on students who differ in the nature of their achievement-related personality dispositions which are assessed using the techniques already described. Hypotheses derived from the theory of achievement motivation concerning effects of ability grouping on the motivation of students who differ in personality provide the guiding ideas of our investigation. We expected to find that ability-grouping might produce an enhancement of achievement-related motivation, as manifested in scholastic performance, development of realistic vocational plans, and reported interest in schoolwork, in some but not necessarily all students. We supposed that students who were more strongly disposed to be motivated to achieve (Achievement) than to avoid failure (Test Anxiety) would generally profit most by systematic ability grouping and that those in whom the motive to avoid failure (Test Anxiety) was relatively stronger would profit least and perhaps even suffer some decrement when compared to a control group not subjected to ability grouping.

The chapters which follow will present the particular hypotheses, procedures, and results of Study A and Study B. Study A, which takes longer to report, produced very little evidence to support the above stated hypotheses though it did raise some important questions concerning the development of vocational aspiration which deserve attention in subsequent research. Study B, which comes last in our presentation, provides strong support of the guiding hypotheses.

CHAPTER 2

STUDY A: EFFECTS OF ABILITY GROUPING BEGINNING IN JUNIOR HIGH SCHOOL ON SUBSEQUENT ACADEMIC ACHIEVEMENT AND VOCATIONAL ASPIRATION

Introduction

Study A was designed to explore some of the possible consequences of an ability grouping program beginning in the 7th grade of junior high school and followed by ability grouping with emphasis on acceleration for highly qualified students in high school. The study was initiated in 1959. At that time, the first junior high school class to have participated in a junior high program of ability grouping in mathematics were 9th graders. The program was designed for students of outstanding general scholastic ability and superior achievement in mathematics. An accelerated program began in the 7th grade and continued through the 9th grade year. Its' chief characteristics were: (a) an enrichment of the basic courses in mathematics in grades 7 and 8; (b) an acceleration of the course in the first year algebra to the extent that one-half of the course in second year algebra was completed. (In subsequent years, the program was broadened to include English and Social Studies for superior junior high school students.)

Following this experience in junior high school, students of superior ability participated in an advanced placement program in high school. It was designed to meet the old issue of challenging the bright student who was held back in his intellectual growth by the so-called "lock-step" curriculum. The program was intended more to accelerate than to enrich high school courses. That is, courses in the typical high school program were geared faster so that superior students would complete the normal requirements in subject matter at the end of the junior year and study college materials as seniors. Advanced placement courses in French, Spanish, English, Mathematics, American History, and accelerated courses in German, Mathematics, Chemistry, and Physics constituted the opportunity open to superior students. The term advanced placement refers specifically to those senior courses which might be counted (at the discretion of colleges to which students applied) for college credit. The term accelerated, which more generally characterize this ability grouping program which began in 7th grade mathematics for superior students, refers to enriched high school courses; feeder courses which prepare superior students for their senior year in high school; and, especially in mathematics, to a program of intermediate difficulty for students who had advanced beyond the normal college preparatory courses but were not highly enough qualified for the advanced placement opportunity as seniors.

In the junior high school ability grouping program, standardized tests and teacher recommendations at the 6th grade level formed the basis for selecting students for special accelerated sections of mathematics in 7th grade or assignment to regular sections. A similar method of selection was employed in 8th and 9th grade. In the accelerated program of high school, qualified students were invited to enter advanced sections in terms of similar standards set by various departments.

Method

Our intention, in beginning the study in 1959, was to isolate a sample of students of superior students who had been placed in accelerated sections in junior high school and a sample of the remaining students, lower in intelligence, who were in regular sections in 9th grade. The former group would constitute those most likely to have a variety of experiences in accelerated sections of various courses in high school; the latter group would not. We could then examine effects of systematic ability grouping on both academic performance in junior high school and subsequently in high school and also explore possible effects on the development of realistic vocational aspirations in this experimental class relative to a control class which had not been systematically exposed to ability grouping emphasizing acceleration of superior students beginning in junior high school.

In order to attempt to identify effects that might be attributed to the ability-grouping experience of the experimental class, control groups of students comparable in ability and motivation who had not been exposed to as systematic ability grouping in junior high school and high school were needed. So we assessed motivation and collected other relevant data from students who were seniors in high school in 1959 (the control class) at the same time that the experimental class was first studied in 9th grade. This group of high school seniors offered the best possibility of a sample in the same school system which had not been systematically subjected to ability grouping and accelerated training for highly qualified students beginning in junior high school.

Our plan, in this exploration, was to retest the experimental class three years later (in 1962) when they had reached the senior year in high school. Then we could compare measures of scholastic achievement and vocational aspiration of groups of students in the two classes who were comparable in intelligence and achievement-related motivation—1962 high school seniors (experimental class) and 1959 high school seniors (control class).

Among the 9th graders in 1959 (the experimental class), data were obtained from students of superior ability then enrolled in special accelerated sections

in mathematics and from a representative sample of students in regular sections. This was the composition of the experimental class who were then tested again as high school seniors three years later (in 1962).

Given an already constituted group of superior students in accelerated junior high school sections in 1959, our initial task was to obtain information concerning their general intelligence and motivation in comparison with that of the representative sample of students assigned to regular sections. We could then attempt to construct adequate control groups from the sample of high school seniors tested in 1959, the group which had not been systematically exposed to ability grouping and accelerated training.

A school official familiar with the general criteria that had been employed for placement of superior students in special sections in junior high school reviewed the test records of 1959 high school seniors and identified students who in his judgement, would certainly have been assigned to special sections in junior high school and accelerated training opportunities in high school had these programs been in effect earlier. These high school seniors, and a representative sample of remaining students obtained by taking every third name in an alphabetical ordering comprised the group of high school seniors tested in 1959. It is from this sample that control groups for the study were formed.

While main interest in this study is focused upon students of high intelligence who were exposed to ability grouping and acceleration in the form of special sections in one class but not in the other, attention is also directed to possible effects of such a program on students of lower intelligence in the regular sections of the ability-grouped class.

When superior students are identified and placed in special sections which allow them to advance more rapidly, whether in junior high school or in the kind of accelerated program that was instituted for qualified college bound students in the high school, the general effect on all students is similar. The very intelligent student and the less intelligent student more frequently find themselves in a learning situation with peers who are more similar in general intellectual ability than when no form of ability grouping is systematically employed.

In the present study, the difference in experience of the 1959 and 1962 high school seniors is one of degree—not a clearcut case of systematic ability grouping for one group and none for the other group. The students who graduated from high school in 1959 had not been exposed to ability grouping in junior high school, nor had the most qualified college bound members of this class been systematically exposed to accelerated classes based on grouping in the early years of high school leading to work acceptable for college credit in the senior year of high school. They had, however, experienced the traditional separation of college bound versus not college bound students

in type of courses elected during the high school years. This, of course, represents ability grouping in some degree. But it is less explicit and systematic than for the 1962 class, and it does not involve the systematic emphasis on acceleration which characterized the program of the brighter, college bound students who graduated in 1962.

The experimental class, then, represents one in which ability grouping had been systematically introduced beginning with mathematics in 7th to 9th grades combined with the greater emphasis on scholastic achievement implied by the accelerated program for highly qualified college bound students in high school.

The control class, in contrast, represents one which had not been exposed to any more systematic ability grouping than normally takes place in the course selections of college bound versus non-college bound students in high school.

Table 2.1 shows the number of students in the experimental class from whom data pertinent to the study were initially collected in the 9th grade in 1959, the number of drop-outs, and the number who were retested in 1962 when they were seniors in high school. The table also shows the number of students selected by a school official who had examined scholastic records of the control class tested as seniors in high school in 1959 from whom pertinent data were obtained.

A depletion in the sample from the experimental class was anticipated, for in addition to the usual reasons for absenteeism on days when critical tests or questionnaires were administered (and on follow-up attempts), quite a number of students had either left the community in the three year interval or were attending some school other than the public high school at the time of the retest. It is reasonable to assume that the similar selective influences had operated on the group of high school seniors tested in 1959 who comprise the control class. In both 1959 and 1962, the procedure of calling students from the early morning homeroom sections by written request from the administrative office in the school was followed. We have no reason to suspect that this procedure was any less effective in 1962 than in 1959.

We acknowledge that the composition of experimental and control groups in this study falls a good deal short of the desired level of precision that might have been attained if the study had been planned before the original class to participate in the homogeneous grouping program had been selected. However, we shall attempt to minimize this deficiency by employing measures of what appear to be the most important general criteria for selection into special sections and accelerated classes: intelligence as measured in junior high school and achievement-related motivation. In terms of these measures, we construct control groups from the 1959 high school seniors who comprise the control class for comparisons with similar groups in the experimental class.

TABLE 2.1

Number of Students in Experimental and Control Classes From
Whom Data Pertinent to Study A were Obtained

	Experimental Class			
	Accelerated Sections		Regular Sections	
	Boys	Girls	Boys	Girls
Original sample for whom 9th grade intelligence score was available.	42	46	61	68
9th grade measures of both n Achievement and Test Anxiety were obtained.	41	43	55	62
Left school by 12th grade.	2	0	12	9
Available for retest in 12th grade.	40	46	49	59
9th-12th grade measures of both n Achievement and Test Anxiety were obtained.	35	40	37	43
Measure(s) of motivation critical for Study A obtained in 12th grade.*	36	44	44	55
	Control Class			
	Superior Students		Remaining Students	
	Boys	Girls	Boys	Girls
Measure of 9th grade intelligence and measure(s) of motivation critical for Study A obtained in 12th grade.*	40	44	41	60

*Both n Achievement and Test Anxiety employed in comparisons among boys. For reasons stated later, only Test Anxiety employed in comparisons among girls.

Description of Measures Administered

Data Obtained from Ninth Graders (Experimental Class) and Twelfth Graders (Control Class) in 1959

n Achievement. A measure of strength of achievement motive (n Achievement) was obtained following the method developed by McClelland, et al. (1953). Boys and girls were tested separately under the condition described by McClelland, et al., as "Neutral," i.e., nothing was done to heighten the motivation of subjects or deliberately to relax them before administration of a thematic apperception test. The pictures were projected on a screen before subjects tested in large groups. The pictures employed for both 9th and 12th grade boys are described by Atkinson (1958, p. 831) as follows:

2. Two men ("Inventors") in a shop working at a machine
33. Boy, smiling, at desk at home
26. Foreman and worker standing near machine in shop
9. Man working on papers at office desk

The pictures employed for girls, who were tested separately, were:

Two young women working in a chemistry laboratory (from Veroff, et al., 1960).

A Young woman seated at a desk in a classroom.

A group of young women at work in what might be a fashion design shop or a Home Economics class.

A well dressed young woman working at a typewriter.

Young woman holding books with rural background scene (Card 2 from female form of TAT).

Imaginative stories were scored for n Achievement following the manual prepared by McClelland, et al. (see Atkinson, 1958) by one of the writers (PO) and two assistants. A rescoring of 28 protocols originally scored three years earlier yielded a rank-order correlation of .92 between n Achievement scores assigned on the two occasions. Intercorrelations among the three coders tested on this sample of 28 were .95, .88, and .85. The total n Achievement score for each student provides a measure from which we infer the strength of motive to achieve success.

Test Anxiety. The high school form of the Test Anxiety Questionnaire (Mandler and Cowen, 1958) was presented to boys and girls in the 9th and 12th grades. It provides a measure of self-reported symptoms of anxiety during achievement tests from which we infer the strength of motive to avoid failure in achievement situations.

Vocational Aspiration. Also administered to boys and girls in both 9th and 12th grades was a questionnaire designed to measure the attractiveness of

various occupations (see Appendix A). The list was different for boys and girls. The list of occupations was derived from The National Opinion Research Center Survey reported in Bendix and Lipset (1953, pp. 411-426) to be representative of the whole occupational prestige hierarchy. Students were asked to indicate, on a four-point scale, how satisfied they would be if they were to end up in each of the stated occupations (Strotbeck, *et al.*, 1957). They were then asked to indicate which of the occupations represented their current vocational objective. ("Which of the occupations listed above come closest to what you are now thinking of trying for when you are finished with your education?") If the vocation of their choice was not listed, they were asked to add it to the list. This provided a measure of each student's vocational aspiration.

Vocational Interest. Each of the 12th graders, but not the 9th graders, was also given the Strong Vocational Interest Inventory (Strong, 1943). This test provides measures of the degree to which interests of students correspond to the interests of persons who are successful in various occupations. It was employed, as shall later be described, to attain a measure of how realistic the stated vocational aspiration of each student was relative to his interest pattern. In addition to the above described measures, the following test scores were obtained from school records.

Measure of Intelligence. Score on the California Test of Mental Maturity obtained in the 9th grade was found to correlate .89 for boys ($N = 92$) and .79 for girls ($N = 91$) with score obtained in the 6th grade in the experimental class. The 6th grade score was undoubtedly one of the most important of the criteria employed in selecting students for special sections in junior high school. Since the correlation between 9th and 6th grade scores was very substantial and the 9th grade score was easily recovered from high school records, we employed the 9th grade score in controlling for differences in intelligence in comparisons between experimental and control classes.

Junior High School Achievement Tests. Two achievement tests administered in the 9th grade, which provided measures relative to national norms, were employed to assess aspects of academic performance that might be immediately affected by the ability grouping program in the junior high school: California Achievement Test in Reading; World Book Arithmetic Test. Comparable tests had been given to the classes who were in 9th grade in 1959 (the experimental class) and in 1956 (the control class).

High School Course Achievement. The Honor Point Index obtained in courses during the sophomore year in high school provided a measure of academic performance, as evaluated by teachers, in the year immediately following the junior high school experience. Honor Point Index achieved over the three years of high school provided an overall measure of academic performance, as evaluated by teachers. The Honor Point Ratio in the high school was determined as follows: (a) Honor Point equivalents of grades assigned in courses were $A = 3$, $B = 2$, $C = 1$, and $D = 0$; (b) Honor Point Index = Total Honor Points

divided by total 1/2 units; (c) computation of Honor Point Index and class rank was based on major credit subjects and as many minor credit subjects as may be used for fulfillment of graduation requirement (one unit maximum and physical education allowed from this group).

National Merit Examination. Scores on the National Merit Examination obtained at the end of the senior year in high school provided some basis for comparing experimental and control groups in terms of achievement in particular areas. Nearly all seniors took this test in 1959, but unfortunately (and unknown, at the time, to the investigators) a much smaller number would take this test (on a volunteer basis) in 1962 as a result of a change in school policy.

Data Obtained from Twelfth Graders (Experimental Class) in 1962

Tests Administered to Control Group in 1959. The same thematic apperceptive measure of Achievement and Test Anxiety Questionnaire which had been administered to the experimental class in 9th grade was readministered late in the final semester of their senior year in high school. The time of administration (May) was the same in 1959 and 1962. These tests provide measures of Achievement and Test Anxiety on the 1962 seniors (Experimental Class) that are directly comparable (except for the fact of their being retest scores after an interval of three years) with scores obtained from the 1959 high school seniors (Control Class). All other tests and questionnaires obtained from the 1959 high school seniors were also obtained in this retest of the students who had been 9th graders in 1959. In addition, some further information was obtained in light of developments in research on achievement motivation during the three year interval.

Estimates of Ability Required for Different Occupations. In order to follow the logic of Mahone's (1960) analysis of the relationship between achievement-related motivation and realism of vocational aspiration, a measure of the perceived difficulty of attaining various occupations listed on the occupation questionnaire was obtained by asking students to indicate for each occupation, including their stated vocational aspiration: "What percentage of the students at this high school have sufficient general ability (i.e., verbal and quantitative ability) to attain the following occupational goals, provided they were motivated to do so?" As will be fully described in a later section, the average of these estimates provides a measure of the relative difficulty of attaining various occupational goals as judged by high school seniors. This measure makes it possible to obtain an index of the degree of realism-unrealism of each student's stated vocational aspiration relative to the consensus of opinion concerning the difficulty of various occupations and his own measured ability. The form employed is presented in Appendix A.

Estimate of Own Ability. Students in the experimental class in 12th grade were also asked to provide an estimate of their own relative ability. They were asked the following question:

Some people feel that grades are a good measure of intelligence or general ability, but this might not be the case for some people who are working, carrying extra heavy extra-curricula programs or often ill. Irrespective of your own grades, where do you think you stand in relation to your fellow students in general ability (i.e., verbal and quantitative ability)?

The form employed to obtain responses to this question is presented in Appendix A. The estimates obtained are employed in an analysis of some of the reasons that students have unrealistic levels of aspiration.

Achievement Risk Preference Scale. In order to explore the potential usefulness of an objective, paired-comparison preference test being developed to assess individual differences in achievement-related motivation called The Achievement Risk Preference Scale (O'Connor and Atkinson, 1960), this test was also administered to the experimental class in 12th grade. This device, developed after the study had begun and employed in exploratory studies with college students, is more easily administered and scored than a thematic apperceptive test, and it yields scores which have been found to correlate positively with thematic apperceptive n Achievement scores and negatively with Test Anxiety scores as predicted from the theory of achievement motivation. These preliminary results tentatively enhance its construct validity and suggest its potential value as a substitute for combined use of thematic apperceptive n Achievement and Test Anxiety in studies of individual differences in achievement-related motivation. But the question of whether or not this test would relate to other behavioral phenomena in the same manner as TAT n Achievement and Test Anxiety scores was still an unsettled question when this study was initiated. The test was included to allow comparison of results obtained using it and the measures of established validity (TAT n Achievement and Test Anxiety Questionnaire). Only evidence of this kind will provide a basis for evaluating the promise of this easily administered self-report test for subsequent studies of performance in school.

The Achievement Risk Preference Scale (presented in Appendix A) confronts the student with a series of paired comparisons in which he either must select a task where probability of success is intermediate versus very high or very low (e.g., if I were a relief pitcher I would prefer to be called into the game when: (a) the score was tied; or (b) my team was trailing 6 to 2) or select an option which indicates willingness (or not) to undertake a task on which one's competence can be evaluated (e.g., when I am reading a magazine and come across puzzles or quizzes I: (a) often stop to try them; or (b) rarely stop to try them). As can be seen in the above examples, the content of the items refers to familiar everyday achievement activities, sports, and games.

Guiding Hypotheses

In focusing attention upon measures of academic performance and vocational aspiration, it is implicitly assumed that if homogeneous ability grouping has a substantial effect upon achievement-related motivation it should be directly evident in an analysis of achievement in school and might also begin to be evident in expressions of realistic long-term achievement concerns of students. Our guiding idea was that as a consequence of increased challenge of schoolwork and the opportunity to move ahead to more advanced work, bright students who are highly motivated to achieve should begin to develop realistic vocational plans at an earlier age. The realism of their vocational aspirations can be assessed by examining the degree of congruity between their stated vocational aims and the pattern of their measured interests, and by examining the disparity between the level of difficulty of the vocation they aspire to and their own measured ability. In other words, we assumed that students of above average intelligence and strong motivation, in particular, might be spurred to begin to think more about their own vocational goals in relation to the challenges and special opportunities afforded in a systematic ability grouping program. As a consequence, their vocational aspirations as high school seniors (when compared with the control class) would display heightened awareness of their own interests in relation to the interests of persons in the occupations of their choice and greater awareness of their own ability in relation to the level of ability probably required for success in various occupations.

In light of the theoretical discussion presented in the introductory section, we expected to find that any enhancement of scholastic performance that is attributable to homogeneous ability grouping would be most apparent among students who are strong in achievement motive (n Achievement) and weak in motive to avoid failure (Test Anxiety) and least apparent among students who are weak in achievement motive and strong in motive to avoid failure. We were led, by theory, to anticipate the possibility that students whose motivation is colored more by anxiety than positive interest in achievement might even perform less well under the more competitive atmosphere of an ability grouping program and similarly to show less evidence of realistic preoccupation with long-term vocational objectives.

Earlier work on the relationship between vocational aspiration and achievement-related motivation among male college students (Mahone, 1960) provides the basis for predicting that vocational aspiration will be more realistic among those who are strong in achievement motive and weak in motive to avoid failure than those who are weak in achievement motive and strong in motive to avoid failure. If achievement-related motivation is intensified in school by ability-grouping, the realism of vocational aspiration among highly achievement-oriented students should be greater than among comparable students who have not participated in an ability grouping program.

The results to be presented are primarily those related to these hypotheses. But the data afford additional opportunities for analysis which will not be neglected. We shall examine, for example, the stability of achievement-related motivation between 9th and 12th grade, as inferred from the correspondence of n Achievement Scores and Test Anxiety Scores obtained from boys and girls in the 9th and then again in the 12th grade. We shall, in addition, look for evidence of change in vocational aspiration between 9th and 12th grades among the students who were tested on both occasions. Of particular interest will be any evidence of growth in degree of realism of aspiration, particularly among students who are highly motivated to achieve.

We present separate analysis of results in Study A for boys and girls for two reasons. The first, and most important, is a recognition of the different problem that achievement, particularly intellectual achievement, poses for the adolescent boy and girl in American Society. This problem is discussed by Mead (1949) in her book Male and Female. It is concretely manifested in previous research on n Achievement (Veroff, et al., 1953) which suggests that the thematic apperceptive measure of n Achievement employed in this study, though valid and useful in studies of high school and college-aged males, may not yet be an adequate tool for assessment of achievement motivation in adolescent and post-adolescent females. The intricacies of the problem of assessing achievement motivation in females are now the subject of systematic research by G. Lesser and E. French at Hunter College (1962). The encouraging results of their work were not available when this study was initiated. So we were unable to design our study of girls in terms of their new information about this problem.

The second reason for separate analysis of results of boys and girls derives from the fact that the content of the measures pertaining to vocational aspiration and interest are different for the two sexes and there is less systematic knowledge about these issues for girls. The indices of realistic vocational aspiration already worked out by Mahone on college men may, in fact, be inappropriate for women, so many of whom realistically aspire to the role of wife and mother which precludes the same degree of long-term involvement in career that is generally expected of young men. In Study B, which deals with pre-adolescent 6th grade students, a separation of the sexes in analysis of the data was found to be unnecessary.

Discussion of Results for Boys

Characteristics of Boys Selected for Accelerated Sections in Junior High Schools

In order to construct control groups that would be comparable in essential respects to the experimental groups for some of the comparisons we are most interested in making, we had to do two things. First, we had to describe how the boys selected for accelerated sections in junior high school differed from those in regular sections. We anticipated that they probably would differ substantially in both intelligence and in achievement-related motivation as measured during the 9th grade. Then, having this information, we had to examine the stability of achievement-related motivation scores from 9th to 12th grade. This information is of fundamental importance for subsequent comparisons between the experimental and control classes because we were able to assess individual differences in achievement-related motivation of the control class only when they were in the 12th grade.

We planned to make comparisons between subgroups of boys who are comparable in intelligence and achievement-related motivation but who differ in that one group has experienced ability grouping and the other has not. A measure of intelligence (California Mental Maturity) was obtained from both experimental and control classes in the 9th grade, but the study did not begin until the control class had reached the senior year in high school. So we must determine the legitimacy of employing the measures of achievement-related motivation obtained from 12th graders (in both the experimental and control classes) in subsequent comparisons between the groups. If it can be shown that there is some stability in Achievement and Test Anxiety scores during this three-year period, then the 12th grade measures of motivation can be viewed as estimates of relatively stable differences between boys during the period of training. If, however, there is no relationship between the Achievement and Test Anxiety scores obtained in the 9th and 12th grades, it will be impossible to construct adequate control groups from the data available on students who were high school seniors in 1959 before ability grouping in the junior high school and accelerated programming in high school had been instituted.

We turn first to the characteristics which distinguish the boys selected for special accelerated sections in junior high school from boys in regular sections. For this analysis, we consider the measures of intelligence and motivation obtained from 9th grade boys in 1959. We confine our attention to the sample for whom measures of 9th grade intelligence and both measures of motivation were obtained.

Table 2.2 shows that boys selected for accelerated sections in junior high school differ from a representative sample of boys in regular sections

in measured intelligence. All but four of the 41 boys in accelerated sections attained scores of 115 or higher on the California Test of Mental Maturity administered in the 9th grade. Only 8 out of 55 of the boys in regular sections scored that high ($\chi^2 = 54.05$, $p < .001$).^{F1*}

TABLE 2.2

Boys in Accelerated and Regular Junior High School Sections
Compared in Terms of Ninth Grade Intelligence (California
Mental Maturity) and Achievement-Related Motivation

Section	N	% Above Combined Median Score			
		Intelligence	n Achievement	Test Anxiety	n Achievement-Test Anxiety
Accelerated	(41)	90	59	17	71
Regular	(55)	15	42	75	33
		$\chi^2=54.05$ $p < .001$	$\chi^2=2.63$ $p < .20$	$\chi^2=31.03$ $p < .001$	$\chi^2=13.58$ $p < .001$

Turning now to the measures of achievement-related motivation, we find in Table 2.2 that boys selected for special sections tend to be higher in n Achievement than boys in regular sections ($\chi^2 = 2.63$, $p < .20$) and that they are significantly lower in Test Anxiety than boys in regular junior high school sections ($\chi^2 = 31.03$, $p < .001$). In each case, the combined distribution of motivation scores has been divided at the median.

The contingency coefficient describing the degree of association between n Achievement and Test Anxiety in our sample of 9th grade boys was $-.22$ ($\chi^2 = 5.04$, $p < .05$). This result is comparable to the result of one earlier study of college men (Raphelson, 1958) when the two tests were administered under experimentally induced achievement-oriented conditions. But several studies with college students have shown that n Achievement and Test Anxiety are not significantly related when the test condition is more relaxed (Atkinson and Litwin, 1960; Mahone, 1960).

The results of recent studies (Atkinson and Litwin, 1960; Mahone, 1960) have shown that simultaneous classification of persons in terms of both n Achievement (conceived as motive to approach success) and Test Anxiety (conceived as motive to approach failure) provides a more sensitive single indi-

*Refer to Footnotes listed on page 163.

cator of resultant motivation to achieve. TAT n Achievement scores and Test Anxiety scores were converted to standard scores and then the standard score on Test Anxiety was subtracted from the standard score on n Achievement. The resultant score (n Achievement-Test Anxiety) is high when an individual stands very high in the distribution of n Achievement scores and very low in the distribution of Test Anxiety scores; the resultant score is low when an individual stands very low in the distribution of n Achievement scores and very high in the distribution of Test Anxiety scores. This index of resultant motivation to achieve, which shall be employed in subsequent comparisons among boys, represents what is theoretically conceived as the resultant of conflict between the tendency to approach achievement-related tasks with positive interest and concern over performing well in relation to standards of excellence and the tendency to avoid failure. The latter tendency is associated with anxiety which, according to the theoretical conception presented in Chapter 1, dampens interest and inhibits performance of achievement-related tasks. The difference between students in accelerated and regular sections in resultant motivation to achieve is also shown in Table 2.2 ($\chi^2 = 13.58$, $p < .001$).

It is the expression of resultant motivation to achieve, rather than n Achievement or Test Anxiety alone, which would be apparent to teachers in the degree of interest and persistence of effort boys display in schoolwork. For both the tendency to perform well in order to achieve and the tendency to avoid the pangs of failure are simultaneously present when one is in a situation in which performance is evaluated relative to some standard of excellence. Evidence obtained in earlier studies has shown that while n Achievement enhanced achievement-oriented performance, Test Anxiety usually serves to produce a decrement in achievement-oriented performance (Atkinson and Litwin, 1960)^{F2}

It is clear from Table 2.2 that the boys selected by teachers for accelerated sections in junior high school score higher on the California Test of Mental Maturity and are also stronger (or more positive) in resultant motivation to achieve. We face the bewildering question of whether we have in fact separately measured intelligence and achievement-related motivation.^{F3} Some of the perplexing issues arising in a discussion of this problem, which is beyond the scope of the present report, are dealt with at length by Sarason (1960) who has found that anxiety produces a decrement in performance on tests employed to measure intelligence when they are administered under competitive conditions. The problem is also discussed by Kagan and Moss (1962) whose recent book Birth to Maturity reviews evidence obtained in a 30 year longitudinal study conducted at the Fels Institute. After careful consideration of relationships between intelligence test scores and independent measures of interest in achievement through childhood and adolescence these writers suggest that for children whose intelligence quotients fall between 100 and 135, as was the case for 73% of the boys in the present study, "the child's motivation to master intellectual skills is a major determinant of individual differences in test score." These writers argue: "For certain populations the IQ can serve as an index of achievement concern." (Kagan and Moss, 1962, p. 130-131). This assertion agrees in principle with the general argument

advanced by Sarason (1960) which emphasizes the often neglected relationship between motivational factors and the achievement-oriented test performance which yields the score traditionally called "intelligence."

The position we take is that until such time that the differences in intelligence test scores that are attributable to differences in ability, per se, can be separated from the differences attributable to motivation (and a similar clarification accomplished with so-called independent measures of motivation) it will be fruitful to classify individuals jointly in terms of both types of measure in studies like the present one. Our major aim in the present study is to provide a basis for evaluating some of the effects of ability grouping. To do this, we must attempt to identify groups of students who are substantially similar in intelligence and motivation who have been taught under ability grouping or not. Evidence later presented will attest the value of our use of both types of measure for classification of subjects.

The Stability of Achievement-Related Motivation From Ninth to Twelfth Grade

The decision to employ high school seniors in 1959 who had not had systematic exposure to ability grouping in junior high school or in high school as the control class in the present study was made on the assumption that achievement-related motivation in boys, at least, would be relatively stable during the three year period from 9th to 12th grade. Kagan and Moss (1959) have found a significant positive relationship between n Achievement in children at ages 8 and 11. More recently these same writers (Kagan and Moss, 1962) present similar evidence of relative stability of n Achievement from adolescence to adulthood. Feld (1960) has also found that boys who were classified high in n Achievement when 8 to 10 years old in terms of TAT n Achievement scores were also more frequently classified high when in high school than boys who were earlier classified low in n Achievement. The data on this point are indeed very slim indeed. It is our view that the very modest positive relationships that have been reported over time periods of any duration probably imply even greater stability in strength of motive to achieve since the reliability of thematic apperceptive measurement is relatively low even when the variety of immediate situational influences on n Achievement scores are tightly controlled in test-retest studies (Haber and Alpert, 1958).

Earlier analyses of split-half and test-retest reliability of thematic apperceptive n Achievement scores on college students over short time intervals has shown more justification for a relatively crude high-low classification of subjects than one which assumes an interval or even an adequate ordinal scale at all points in the distribution. For example, McClelland, et al. (1953, p. 191-193) have reported that the product moment correlation (which

assumes an interval scale) obtained between *n* Achievement scores of male college students on equivalent three-picture forms administered on the same occasion was .64 but fell to .22 when the two forms were administered a week apart. This, at first glance, seems to suggest very little stability over the one week interval. Yet when subjects were classified only as high (above the median) and low (below the median) on the two forms, the percentage agreement in classification was 78% when the tests were administered during the same hour and nearly as high, 72.5% when administered a week apart. There is much greater apparent stability when a less sensitive classification in terms of motive strength is employed, one which does not make the strong assumption of an interval scale required in the use of parametric statistics.

This suggests two things for studies of stability of motivation over longer time periods using the presently available technique for assessing strength of achievement motive: (a) an upper limit as to what should be expected in terms of percentage agreement in classification of individuals as relatively high or low in *n* Achievement given the known sensitivity of the technique of measurement to immediate situational influences; and (b) the need to distinguish the theoretical question (How stable are individual differences in achievement motive?) from the empirical question (How stable are individual differences in TAT *n* Achievement score?) The latter question refers both to stability of a personality characteristic and to the adequacy of control of situational factors which influence the *n* Achievement score at the time the various tests are administered, the adequacy of the coding of the content of the stories, etc. Previous research has shown the *n* Achievement score to be very sensitive to immediate situational influences (e.g., an examination or an experience of success or failure) which temporarily raises or lowers motivation in relation to the level that is normally characteristic of the person in the day-to-day classroom (McClelland, et al., 1953; Atkinson, 1958).

Points discussed in the preceding paragraphs are nicely illustrated by the results of our examination of stability of achievement-related motivation in boys of the experimental class. Boys who were tested as 9th graders were retested as 12th graders during the final month of their senior year in high school. As mentioned earlier, depletion in number of cases is attributable in part to the fact that a substantial number of students either had moved to another town or were attending some other local school than the public school in which the study was conducted. Others were unable to attend any of the specially scheduled group test sessions for reasons of illness or commitments which could not be broken. The product moment correlation obtained between 9th and 12th grade Test Anxiety scores of boys tested on both occasions was .61 ($N = 80$). This indicates a very adequate level of stability. The product moment correlation between TAT *n* Achievement scores obtained for boys on the two occasions, however, was only .18 ($N = 79$).

Guided by the results of earlier test-retest studies (reviewed above), we examined and compared the stability of n Achievement scores and Test Anxiety scores making cruder classifications of students in terms of relative strength of motivation. This procedure was consistent with our intention of making a high (above the median)—low (below the median) n Achievement classification of students in the experimental and control groups in later comparisons in terms of the scores they obtained during the 12th grade. So we were interested in determining whether or not there was any evidence that boys who scored high in n Achievement as 9th graders more frequently tended to score high in n Achievement as 12th graders than boys who scored low in the 9th grade. Table 2.3 shows how frequently boys classified high or low in terms of several criteria tended to score high (above the median) rather than low (below the median) in 12th grade.¹⁴ A comparable analysis is made for Test Anxiety to afford some basis for evaluating the relative stability of the two measures when the instruments are employed to provide a less sensitive classification of students in terms of relative motive strength.

TABLE 2.3

Stability of n Achievement and Test Anxiety in Boys of the Experimental Class Tested in Ninth and Twelfth Grades

	% Scoring High (Above Median) in Twelfth Grade			
	N	n Achievement	N	Test Anxiety
<u>Ninth Grade Measure</u>				
High (above median)	(39)	59	(41)	76
Low (below median)	(40)	48	(38)	21
		$\chi^2 = 1.04$ n.s.		$\chi^2 = 23.48$ $p < .001$
<u>Thirds</u>				
High	(23)	74*	(26)	81
Mid	(29)	48	(27)	44
Low	(28)	39	(26)	23
		$\chi^2 = 6.01, 2 \text{ df}$ $p < .05$		$\chi^2 = 18.87, 2 \text{ df}$ $p < .001$
<u>Extreme Quartiles</u>				
Highest	(18)	83	(20)	90
Mid	(42)	48	(39)	41
Lowest	(19)	37	(20)	25
		$\chi^2 = 9.05, 2 \text{ df}$ $p < .02$		$\chi^2 = 19.04, 2 \text{ df}$ $p < .001$

*Comparable percentages for boys in accelerated and regular sections treated separately were: Accelerated=81%, 53%, 40%; Regular=67%, 43%, 41%.

There can be little question that boys who are high and low in Test Anxiety in the 12th grade are primarily those who were high (above the median) and low (below the median) in the 9th grade. In the case of n Achievement score, one must consider highest and lowest thirds or quartiles in the 9th grade to find a comparable prediction of standing above and below the median in the 12th grade. The analysis in terms of extreme quartiles and interquartile range and thirds of the distribution of 9th grade scores in Table 2.3 shows that boys classified very high on n Achievement in 9th grade more frequently tended to score above the median in 12th grade than boys classified very low in 9th grade ($\chi^2 = 9.05$, 2 df, $p < .02$ and $\chi^2 = 6.01$, 2 df, $p < .05$, respectively). The contingency coefficient of degree of association between the two n Achievement scores yielded by the analysis in terms of extreme quartiles is .33 ($p < .02$). We note that Test Anxiety affords only a slightly better prediction of 12th grade standing above or below the median for boys in the extreme quartiles in 9th grade. The big difference between the two tests comes in making stable discriminations in the middle of the distribution of scores. The measure of Test Anxiety does this sufficiently well; the measure of n Achievement does not.

The footnote in Table 2.3 presents an analysis of boys in accelerated sections and in regular sections employing the same criteria that are employed above in terms of high-mid-low thirds on n Achievement in the 9th grade. The results show that the scores of boys in the accelerated sections are, if anything, somewhat more stable in terms of this relatively insensitive analysis, than the scores of boys in the regular sections despite the fact that the product moment correlation which assumes an interval scale was significant for boys in regular sections $r = .33$ ($p < .05$) and not for boys in special sections, $r = -.01$. How is this to be explained?

Further analysis provides some evidence that helps to understand what has happened. Although the relative frequency of changes in n Achievement score is the same for boys in accelerated and regular sections, the shifts in scores of boys in accelerated sections between 9th and 12th grades are more frequently large shifts and downward shifts than those of boys in regular sections. Fifty percent of the changes in n Achievement score of boys in regular sections between 9th and 12th grade were decreases, but 65% of the changes were decreases among boys in the accelerated sections. Furthermore, 65% of the changes of accelerated students were above the median amount of change (which was 5 points); only 45% of the changes of the regular students were that large. This means, in effect, that accelerated students who scored just above the combined median in the 9th grade were more likely to fall below the combined median in 12th grade and students in regular sections who scored just below the combined median in 9th grade were more likely to score just above the combined median in 12th grade. Those scoring in the extreme quartiles in the 9th grade would not be likely to change their position with respect to the median score of the combined group even though the general pattern of a decrease in score prevailed for students in special sections.

The simplest explanation of more frequent decreases in n Achievement score for boys in accelerated sections between 9th and 12th grades is that situational arousal of n Achievement was probably greater for these boys, in particular, during the 9th than 12th grade. Although the conditions at the time of administration of the thematic apperceptive measure were comparably neutral in the sense that the examiners did nothing to heighten motivation before administration of the test, we must remember that the first administration took place during the time that the boys were members of special sections in junior high school and the whole testing procedure was explained to them, at the time, as an effort to help evaluate the program. The second test was administered near the end of the senior year when, for many superior students, life in school becomes relatively relaxed because all or most important hurdles have been successfully surmounted. This may not be an entirely satisfactory explanation of the absence of product-moment correlation between test scores over the three year interval, but it does account for the fact that boys who scored in the extreme quartiles on n Achievement as 9th graders still score relatively high and low respectively as high school seniors; and it does provide some basis for understanding how subjects in the regular and accelerated sections who scored slightly above or below the median of the combined group as 9th graders might change their positions with respect to the combined median score in 12th grade.

Given this minimum evidence of the stability of n Achievement score over the three year period when an insensitive classification in terms of motive strength is employed, we shall consider the stability of achievement-related motivation over the three year period using the combined index of n Achievement and Test Anxiety, the measure of resultant motivation to achieve. Table 2.4 shows how this index (n Achievement-Test Anxiety), derived from assessment of boys in 9th grade relates to n Achievement, Test Anxiety, and resultant motivation to achieve as assessed in the 12th grade.

TABLE 2.4

Relation of Ninth Grade Index of Resultant Motivation to Achieve (n Achievement-Test Anxiety) to Measures of Motivation Obtained in Twelfth Grade for Boys in the Experimental Class

Ninth Grade		% Above Median Score		
		Twelfth Grade		
n Achievement-Test Anxiety	N	n Achievement	Test Anxiety	n Achievement-Test Anxiety
High	(36)	66	31	64
Low	(37)	38	68	35
		$\chi^2=6.08$	$\chi^2=10.00$	$\chi^2=6.04$
		$p < .02$	$p < .01$	$p < .02$

Table 2.4 shows that boys who score high in n Achievement in 12th grade were significantly higher in resultant motivation to achieve in 9th grade than boys who score low in n Achievement as high school seniors ($\chi^2 = 6.08$, $p < .02$).^{F4} The index of resultant motivation to achieve in 9th grade is also related negatively, as expected, to 12th grade Test Anxiety score ($\chi^2 = 10.00$, $p < .01$) and positively to the index of resultant motivation to achieve derived from n Achievement and Test Anxiety in the 12th grade ($\chi^2 = 6.04$, $p < .02$). We view this as further, and stronger evidence of the relative stability of differences in achievement-related motivation from 9th to 12th grades and justification for using the 12th grade measure of resultant motivation to achieve (n Achievement-Test Anxiety) in comparisons between boys in the control class who were seniors in 1959 and boys in the experimental class who were seniors in 1962 with some confidence that the motivational classification refers to a difference that is characteristic of the boys during junior and senior high school years.

The relationship between n Achievement and Test Anxiety, which was negative for these boys in 9th grade is insignificant in 12th grade ($\chi^2 = .35$). This also can be attributed to the decreasing trend of n Achievement scores among boys who were in accelerated sections between 9th and 12th grades. Boys in this group, who are characteristically low in Test Anxiety, more frequently scored higher in n Achievement in 9th than in 12th grade.

Summary

Examination of the stability of Test Anxiety and n Achievement scores from 9th to 12th grade provides good evidence of stability of Test Anxiety in boys but only minimal evidence of stability of TAT n Achievement scores. However, analysis of the relationship between the index of resultant achievement motivation (n Achievement-Test Anxiety) derived from 9th grade motivation scores to both n Achievement and Test Anxiety in the 12th grade provides justification for assuming sufficient stability in achievement-related motivation from 9th to 12th grades to allow comparisons among groups of seniors classified high-low in terms of the 12th grade index of resultant motivation to achieve on the assumption that the difference measured in 12th grade is generally characteristic of boys throughout junior and senior high school.

Composition of Experimental and Control Groups

We have shown that the boys selected for accelerated junior high school sections were predominantly higher in intelligence and higher on the 9th grade index of resultant motivation to achieve than those taught in regular sections. We draw the same conclusion from Table 2.5 which describes the boys who had

been in accelerated and regular sections in terms of both intelligence and the index of resultant motivation to achieve derived from 12th grade n Achievement and Test Anxiety scores.

TABLE 2.5

Boys in Experimental and Control Classes Classified in Terms of Ninth Grade Intelligence (California Mental Maturity) and Twelfth Grade Index of Resultant Motivation to Achieve (n Achievement-Test Anxiety)*

n Achievement- Test Anxiety	Accelerated		Regular	
	Intelligence			
	High (115+)	Low (114-)	High (115+)	Low (114-)
<u>Experimental Class</u>				
High	22	2	8	8
Low	11	1	0	28
<u>Control Class</u>				
High	25			16
Low	15			25

*All boys for whom both measures of motivation were obtained in 12th grade are included in the table. Subgroups within boxes constitute the experimental and control groups in later comparisons.

The four groups contained within the boxes of Table 2.5 under experimental class constitute the experimental groups to be compared with groups of comparable intelligence and motivation in the control class which had not been systematically exposed to ability-grouping in junior high school and high school.^{F5} The aberrant cases in Table 2.5 (those not contained within the boxes) were eliminated in subsequent analysis. The experimental (ability-grouped) boys fall into two major categories: (a) those above the median in intelligence (as measured in 9th grade) who had participated in accelerated mathematics sections in junior high school and accelerated classes in high school; (b) those below the median in intelligence (as measured in 9th grade) who had participated in regular sections of mathematics in junior high school and non-accelerated and, for the most part, non-college preparatory classes in high school.

Since there was no systematic ability grouping plan in effect when boys in the control class were in junior high school, nor accelerated classes during high school, there is no basis for distinguishing the type of class they were in. All these students were taught in classes having a broader range of individual differences in ability during junior high school and high school than those in the experimental ability-grouping program. We employ the same dividing line on 9th grade intelligence in order to provide control groups for the experimental groups shown within the boxes in Table 2.5. We now have subgroups of boys in the experimental and control classes classified as high or low in resultant motivation to achieve (n Achievement-Test Anxiety) in terms of the median score of boys in their own 12th grade class and in terms of intelligence as measured in the 9th grade. The comparability of experimental and control groups in 9th grade intelligence is shown in Table A.1, Appendix A.

Scholastic Achievement in Junior High School

We are guided by the hypothesis that achievement-related motivation would be heightened by ability grouping. This should lead to greater enhancement of performance by those who are disposed to be positively motivated to achieve than those who are more likely to be anxious about failure. We consider first performance on two achievement tests given in the second semester of the 9th grade: The World Book Arithmetic Test and California Reading Test. Scores obtained in 1959 and 1962 are comparable since they were stated in terms of national norms. Scores obtained by students in the two years were combined in a single distribution and common breaking points applied to identify the extreme quartiles and interquartile range of the combined distribution. The results are presented descriptively in Table 2.6.

General Effects of Differences in Intelligence and Motivation

The results for the two classes (1962 and 1959) are combined in the right hand column of Table 2.6. There we find the expected effects of both intelligence and resultant motivation to achieve (n Achievement-Test Anxiety) on scholastic performance. In the highly intelligent group, upper quartile performance on both arithmetic and reading tests is more frequent among boys who are highly motivated to achieve than among those who are low. On the reading test, 58% of the boys high in resultant motivation to achieve scored in the upper quartile; only 35% of the boys low in resultant motivation to achieve scored that high ($\chi^2 = 3.42, p < .10$). The result is similar on the arithmetic test, on which 51% of the highly motivated boys as contrasted with 35% of the boys weaker in achievement motivation score in the upper quartile ($\chi^2 = 1.64, p < .20$).

TABLE 2.6

Performance of Boys in Experimental and Control Classes on 9th Grade
World Book Arithmetic Test and California Reading Test

(Combined distribution of scores divided at the upper and lower quartiles)

n Achievement-- Test Anxiety	Intelligence	N	Control, %			N	Experimental, %			N	Combined, %		
			H	M	L		H	M	L		H	M	L
Arithmetic (World Book)													
High	High	(23)	43	48	9	(22)	59	41	0	(45)	51	44	5
Low	High	(12)	25	75	0	(11)	45	55	0	(23)	35	65	0
High	Low	(14)	14	57	29	(8)	0	100	0	(22)	9	73	18
Low	Low	(22)	9	36	55	(27)	4	41	55	(49)	6	39	55
Reading (California)													
High	High	(23)	39	57	4	(22)	77	23	0	(45)	58	40	2
Low	High	(12)	8	84	8	(11)	64	36	0	(23)	35	61	4
High	Low	(14)	0	71	29	(8)	12	63	25	(22)	5	68	27
Low	Low	(23)	0	43	57	(27)	7	26	67	(50)	4	34	62

Among the boys of lower intelligence, the direction of the difference again reflects the difference in motivation. But now the difference is most apparent when one compares the percentage who score in the lowest quartile on the two tests. On the arithmetic test 55% of the boys who are low in resultant motivation to achieve, as compared with 18% who are highly motivated to achieve score in the lowest quartile ($\chi^2 = 8.41$, $p < .01$). On the reading test, the comparable figures are 62% and 27% ($\chi^2 = 7.38$, $p < .01$).

In other words, when intelligence is relatively high (115 or above) strong achievement motivation increases the possibility of outstanding performance; when intelligence is lower (114 or below), strong achievement motivation significantly reduces the chance of extremely low academic performance. These are generally expected effects of differences in intelligence and achievement-related motivation on scholastic performance.

Effects of Differences in Intelligence and Motivation Experimental Versus Control Class

Let us now consider the effects of ability grouping by examining the performance of students in the experimental classes in comparison with the control group. Again we shall consider first the performance of boys who are high in intelligence, but now we compare the performance in the 1962 (ability grouped) class and the 1959 (control) class. It is apparent that both high and low motivation groups more frequently scored in the upper quartile on the 9th grade arithmetic and reading tests under ability grouping than in the control class. There is, however, no evidence to support the hypothesis that those high in resultant achievement motivation would show relatively greater improvement under ability grouping. In fact, slightly greater percentage gains are shown by those low in resultant motivation to achieve (the more anxious boys) on both tests.

Among the boys highly motivated to achieve who are above the median in intelligence, 59% in the ability-grouped class as contrasted with 43% in the control class scored in the upper quartile on the arithmetic test. The difference is not statistically significant ($\chi^2 = .82$). Nor is the difference between the 45% of ability-grouped boys who were low in resultant motivation to achieve who scored in the upper quartile on this test and the 25% of comparably motivated boys in the control class who scored that high.

On the reading test, however, the superiority of the ability-grouped class is statistically significant. Among the boys high in intelligence, 77% of the highly motivated boys in the ability-grouped class as compared with 39% of the control class scored in the upper quartile ($\chi^2 = 6.7$, $p < .01$); and 64% of the ability grouped boys who were low in resultant motivation to achieve as compared with 8% in the control class scored in the upper quartile ($p < .02$, exact test). In other words, the arithmetic performance of highly intelligent boys who had participated in accelerated mathematics sec-

tions of junior high school was higher, though not significantly higher than that of the control class; but the reading performance of the boys who had been in these special junior high school sections of mathematics was substantially (significantly) better irrespective of the strength of resultant motivation to achieve. We can offer no explanation of why reading, but not arithmetic, should be sensitive to ability grouping in mathematics.

The performance of boys who are strong in resultant achievement motivation is higher than that of those who are low in resultant achievement motivation in both the ability grouped and control classes. We had supposed the difference would be more pronounced in the ability-grouped class. It was not.

Looking now at boys who are below the median in intelligence, we find very little evidence of a difference between ability-grouped and control classes on the 9th grade reading test whether achievement motivation is high or low. On the arithmetic test, there is no difference between the boys in ability-grouped and control classes who are low in resultant achievement motivation but some evidence that the more highly motivated boys in the ability-grouped class less often tend to score in the lowest quartile than their counterparts in the control class. The difference evaluated using Fisher's exact test is not statistically significant.

The lowest performance in both classes is by boys of low intelligence who are also low in resultant motivation to achieve. We had expected the superior performance of boys highly motivated to achieve to be more apparent in the ability-grouped class than the control class. There is a very slight but statistically insignificant trend in this direction among the boys who are below the median in intelligence.

Summary

Performance on 9th grade achievement tests in arithmetic and reading generally tends to be higher among boys of high intelligence who have experienced ability-grouping in junior high school. The superiority of ability-grouped boys is statistically significant on the 9th grade California Reading Test irrespective of strength of resultant motivation to achieve. We find, however, no support for the hypothesis that boys who are highly motivated to achieve would show substantially greater improvement under ability grouping than boys who are weak in resultant motivation to achieve. There is suggestive evidence that those scoring low on the index of resultant motivation to achieve (and hence generally scoring higher in anxiety) among the highly intelligent group may actually profit more by the experiences offered in special sections in junior high school than their more positively motivated peers.

Generally expected effects of differences in intelligence and resultant motivation to achieve are apparent in both the ability-grouped and control classes. The highest level of performance is obtained when both intelligence

and resultant motivation to achieve are high; and the lowest level of performance is obtained when both intelligence and resultant motivation to achieve are low.

Scholastic Achievement in High School

Our comparison between the performance of the experimental, ability-grouped class and the control class is complicated by the fact that some of the special tests given accelerated high school students in 1962 had not been employed with 1959 high school seniors. Hence, we must turn to an examination of the grades attained during the sophomore year and the overall grade attainment of boys during the three year high school program as one common basis of comparison and to scores attained on the National Merit Examination of comparable groups of subjects in the two classes who took that examination during their senior year.

We consider first the Honor Point Index attained during the sophomore year of high school. Since our main interest is to compare the performance of students who are comparable in intelligence and achievement-related motivation in the ability-grouped class and the control class, we first divided the combined distribution of Honor Point Indices from the two classes at the upper and lower quartiles to provide an analysis comparable to the analysis of 9th grade achievement test performance.

Table 2.7A shows the relationship between intelligence (as measured in 9th grade) and n Achievement-Test Anxiety (as measured in 12th grade) to Honor Point Index during the sophomore year and the final Honor Point Index in high school. Students of relatively high and low intelligence normally take different programs of study, so the grades attained are not always strictly comparable in meaning. We assume, however, that the general nature of courses taken by students of high intelligence in the two years are directly comparable and that the kinds of courses taken by students of lower intelligence in the two years are directly comparable. Hence, we are able to compare evaluations of performance by teachers, as reflected in the Honor Point Index, of students who are comparable in intelligence in the ability-grouped and control classes.

The results for the control class show the generally expected effect of differences in intelligence and resultant motivation to achieve on scholastic performance as measured by grades attained. This class of boys was not exposed to systematic ability grouping in junior high school or accelerated courses based on ability grouping in high school. In the control class, boys who are high in intelligence and high in resultant motivation to achieve more frequently attain grades in the highest quartile than those who are equally intelligent but low in motivation in both the sophomore year ($\chi^2 = 4.97$,

TABLE 2.7

Highschool Performance (Honor Point Index) of Boys in Experimental and Control Classes

n Achievement-Test Anxiety	Intelligence	Control (%)			Experimental (%)			Combined (%)					
		N	H	M	L	N	H	M	L	N	H	M	L
A. Combined Distribution of Indices From Two Classes Divided at Extreme Quartiles													
		<u>Sophomore Year</u>											
High	High	(25)	56	40	4	(22)	36	64	0	(47)	47	51	2
Low	High	(15)	20	73	7	(11)	55	45	0	(26)	34	62	4
High	Low	(13)	23	54	23	(8)	0	50	50	(21)	14	52	34
Low	Low	(23)	9	56	35	(28)	0	25	75	(51)	4	39	57
		<u>Three Years High School</u>											
High	High	(25)	56	40	4	(22)	45	55	0	(47)	51	47	2
Low	High	(15)	20	73	7	(11)	55	45	0	(26)	35	62	3
High	Low	(16)	0	81	19	(8)	0	50	50	(24)	0	71	29
Low	Low	(25)	8	44	48	(27)	0	37	63	(52)	4	40	56
B. Separate Distributions for Each Class Divided at Extreme Quartiles													
		<u>Sophomore Year</u>											
High	High	(25)	48	48	4	(22)	50	50	0	(47)	49	49	2
Low	High	(15)	20	73	7	(11)	64	36	0	(26)	38	58	4
High	Low	(13)	15	62	23	(8)	0	75	25	(21)	9	67	24
Low	Low	(23)	4	35	61	(28)	3	36	61	(51)	4	35	61
		<u>Three Years High School</u>											
High	High	(25)	56	40	4	(22)	45	55	0	(47)	51	47	2
Low	High	(15)	20	73	7	(11)	55	45	0	(26)	35	62	3
High	Low	(16)	6	69	25	(8)	0	63	37	(24)	4	67	29
Low	Low	(25)	8	32	60	(27)	0	44	56	(52)	4	38	58

$p < .05$) and on the overall high school record ($\chi^2 = 4.97$, $p < .05$). Boys who are low in intelligence and low in resultant motivation to achieve more frequently attain grades in the lowest quartile than more highly motivated boys of comparable intelligence. The difference is not statistically significant on sophomore grades ($\chi^2 = .53$), but it is near statistically significant on the three year Honor Point Index ($\chi^2 = 3.60$, $p < .10$). Particularly striking is the fact that 23% of our sample of boys below the median in intelligence but highly motivated to achieve in the 1959 control class ranked in the upper quartile in grades during the sophomore year.

The picture is different in the 1962 (ability-grouped) class. Among the group of boys high in intelligence, those scoring low in resultant achievement motivation (and presumably the more anxious boys) more frequently attain high (upper quartile) grades in the sophomore year and for three years of high school work than boys who score high in resultant motivation to achieve. This result, while not statistically significant in either case ($\chi^2 = .99$ and $\chi^2 = .24$) is, nevertheless, clearly contrary to our expectation that boys highly motivated to achieve would show superior performance under an ability grouping program which allowed possibilities for acceleration.

The pattern of results for boys classified low in intelligence in the 1962 (ability-grouped) class shows that highly motivated boys less frequently attain grades in the lowest quartile than boys who are low in resultant motivation to achieve in both the sophomore year ($\chi^2 = .84$) and on the three year record ($\chi^2 = .06$) as generally expected but differences are not significant. More striking is the fact that the percentage of boys of low intelligence attaining grades in the lowest quartile of the combined distribution is substantially larger in the ability grouped class than in the control class. The difference is statistically significant for both sophomore year and final honor point index when all boys scoring below the median in intelligence in the two years are compared irrespective of differences in motivation ($\chi^2 = 12.0$, $p < .001$ and $\chi^2 = 4.15$, $p < .05$, respectively). This may mean that there is some impoverishment in the training of students low in intelligence when emphasis is placed upon an accelerated program for the brighter students, or it may simply reflect the fact that grading practices are influenced by a systematic ability grouping program in the school which tends to make more salient the fact that students in certain programs are known to differ in intelligence.

A comparable analysis of the frequency of high grades among the highly intelligent boys in the two years, irrespective of strength of motivation, showed no evidence of a significant difference between the two classes. But comparison of the performance of boys above the median in intelligence who are classified high in resultant motivation to achieve in the two classes shows that those in the ability grouped class somewhat less frequently attain grades in the upper quartile than those in the control class in both the sophomore year ($\chi^2 = 1.81$, $p < .20$) and on the three year high school record

($\chi^2 = .52$, n.s.). On the other hand, boys in the high intelligence group who are classified low in resultant motivation to achieve (the more anxious boys) more frequently attained grades in the upper quartile under ability grouping than in the control class both in the sophomore year and on the three year record, though neither difference evaluated by the exact test is statistically significant. On the face of it, this at least suggests that the more anxious of highly intelligent boys (those scoring low on the index of resultant achievement motivation) may tend to profit more by the accelerated program in high school than their peers who are highly motivated to achieve. With a larger number of cases, this trend might have attained statistical significance.

To check on the possibility that this result might be some artifact of differences in grading practices occasioned by the introduction of systematic accelerated courses for the highly intelligent students in the 1962 class, we constructed separate distributions of Honor Point Indices for the two classes, again breaking each of the distributions at the upper and lower quartiles. This analysis is shown in the bottom half of Table 2.7.

Relative to the grades assigned to their own class, we find very little evidence that boys of high intelligence who score high in resultant achievement motivation more often attained high grades in the control class than in the ability grouped class. We do find, however, that the highly intelligent boys who scored low in resultant achievement motivation more frequently attained grades in the upper quartile in the ability grouped and accelerated class than in the control class during the sophomore year ($p < .07$, exact test) and on the three year record although the latter difference just falls short of statistical significance. This means, in effect, that the accelerated program based on ability grouping has removed the differential in academic performance attributable to strength of achievement-related motivation that is apparent among the boys of high intelligence in the control class which had no systematic exposure to this type of program.

Summary

Despite the difficulties inherent in the use of grades assigned in courses as a measure of scholastic performance by different students in different years, we do find suggestive evidence that one effect of an ability grouping program, continued throughout high school and enhanced by accelerated courses for brighter students, may be to improve the performance of boys who are normally low in resultant motivation to achieve. These are boys who tend to score high on the Test Anxiety Questionnaire and relatively low on the thematic apperceptive measure of Achievement. Our expectation that students strongly motivated to achieve would show the greatest enhancement of performance under ability grouping is not supported by the results of this analysis of high school grades.

In the control class, which had not been systematically exposed to ability grouping beginning in junior high school, grades attained in the sophomore year and in three years of high school are related to differences in intelligence and resultant achievement motivation as generally expected. Intelligence has the greatest effect on grades attained, but holding intelligence constant, the effect of differences in strength of achievement motivation are clearly apparent. In the experimental class, those subjected to ability grouping in junior high school and accelerated programming (for the highly intelligent) in high school, the differential in performance associated with achievement motivation in the control class is not apparent. Boys of high intelligence who score low in resultant achievement motivation attain grades as high or higher than those who score high in resultant achievement motivation. Among the boys of lower intelligence, the effect of the difference in strength of achievement-related motivation is apparent in both the ability-grouped and control classes. This is probably attributable to the fact that high school experiences of boys below the median in intelligence were probably much more alike for the two classes than the experiences of those who were high in intelligence. For in both years, intelligence and past achievement were the main criteria for placement in college-bound or non-college bound programs. There is that degree of ability grouping even in the 1959 control class. However, the greater stress placed on ability grouping, in the form of accelerated classes for most qualified students in the 1962 class provided a markedly different experience for students of high intelligence in the 1962 class as compared with their counterparts in the 1959 class.

National Merit Examination

All students took the National Merit Examination in 1959, but (unfortunately) in 1962 it was an optional matter. As a consequence we were able to obtain scores on this test for only a little more than half of the students classified high in intelligence in the experimental class and so few of those low in intelligence as to make comparisons involving the latter group impossible. To make any use of the sample of boys in the experimental class who did take the test, we had to ascertain whether or not they differed significantly from their classmates who did not take the test. Of the 14 boys in the high intelligence group who did not take the test in 1962, 12 were high in resultant motivation to achieve and 2 were low in resultant motivation to achieve. Table A.2 of Appendix A shows that the boys who took the exam do not differ from those who did not take the exam in intelligence, but they did slightly more often attain higher grades in the three years of high school ($p < .30$). While the difference is not statistically significant, it does mean that comparisons between experimental and control classes based on small numbers of cases must be evaluated in light of the fact that the sample in the ability-grouped class is slightly biased. This will be taken into account in the interpretation of the results.

Table 2.8 presents a descriptive comparison of National Merit Examination scores of the available samples of boys above the median in intelligence in the two years. On each of the tests, the scores obtained in the two years have been combined and divided at the median to provide a picture of the relative performance of the several groups.

TABLE 2.8

National Merit Examination Performance of Boys Classified High in Intelligence in the Experimental Class and the Control Class
(The combined distribution of scores obtained from samples in the two classes is divided at the median on each test)

n Achievement— Test Anxiety	% Scoring Above Median			
	Control (1959)		Experimental (1962)	
	N	%	N	%
<u>English</u>				
High	(23)	57	(10)	40
Low	(15)	33	(9)	89
<u>Mathematics</u>				
High	(23)	43	(10)	50
Low	(15)	33	(9)	78
<u>Social Studies</u>				
High	(23)	43	(10)	70
Low	(15)	47	(9)	67
<u>Natural Science</u>				
High	(23)	43	(10)	50
Low	(15)	33	(9)	77
<u>Word Usage</u>				
High	(23)	43	(10)	50
Low	(15)	27	(9)	67
<u>Total Comprehensive</u>				
High	(23)	52	(10)	40
Low	(15)	33	(9)	77

The results of this comparison are generally consistent with earlier comparisons of boys above the median in intelligence in terms of grades attained. In the control class, boys high in resultant motivation to achieve generally tend to score higher than those who are low in resultant motivation to achieve, although none of the differences are substantial enough to be statistically significant. In the experimental class, which had been subjected to ability grouping in junior high school and a program of acceleration in high school, the boys classified low in resultant achievement motivation (the more anxious boys) generally score higher than those who are high in resultant motivation to achieve as was also apparent in analysis of grades attained. When boys of comparable motivation in the ability-grouped and control classes are compared, it is apparent that there is little systematic difference in the performance of those high in resultant motivation to achieve in the two classes, but boys who are low in resultant motivation to achieve in the experimental class score consistently higher than comparably motivated boys in the control class. On the total comprehension index, which is based on summation of scores obtained in the separate subtests, 77% of the boys low in resultant achievement motivation in the ability-grouped class score above the median as compared to 33% of comparably motivated boys in the control class ($p < .09$, exact test). While perhaps an overestimate of the difference between the performance of boys low in resultant achievement motivation in the two classes due to the selective factors operating to determine who would take the National Merit Examination in 1962, the result is generally consistent with earlier comparisons which have shown, contrary to our prior expectation, that the ability-grouping program served to enhance, in particular, the scholastic performance of boys above median intelligence who are normally relatively anxious in achievement situations.

The Realism of Vocational Aspirations

In planning the study, we assumed that one of the less direct manifestations of increased interest in achievement attributable to ability grouping might be the development of a more serious and realistic attitude toward future vocation. We were guided by earlier results presented by Mahone (1960) which showed more realistic vocational aspirations among college students who are strong in Achievement and weak in Test Anxiety. In the analysis which follows, we are not concerned with the specific vocational objectives of students in the experimental and control classes (see Table A.3 in Appendix A for a descriptive table). We are, however, interested in the degree to which stated vocational aims are realistically related to the general ability of a student and to the pattern of his occupational interests. The two most frequent reasons for dissatisfaction with a certain line of work and the accompanying loss of time in getting settled into some field of productive work are lack of ability required for the job or insufficient interest in the kind of life one leads in a particular occupation. These problems are more fully discussed by

Mahone (1960) whose study of unrealistic aspiration among college students we use as a model for the present analysis.

Application of the theory of achievement motivation to analysis of vocational aspiration is based on evidence obtained by Mahone (discussed by Crockett, 1962) that the hierarchy of occupations which define the future career or job possibilities for a high school student represents a series of achievement tasks of graded difficulty. Data obtained by Mahone from college men showed that the average estimate by college students of the percentage of men having requisite general ability to succeed in various occupations correlated $-.85$ with the traditional ordering of occupations in terms of the prestige accorded them. The stability of this traditional ordering of occupations, with professionals and managers at the top of the hierarchy, and unskilled occupations at the bottom has been demonstrated by Inkeles and Rossi (1956). These writers have found the ordering of occupations very highly correlated in all modern industrial societies.

The theory of achievement motivation (Atkinson, 1957) rests on the assumption that the attractiveness of success at some task is greater the more difficult the task. The correlation of $-.85$ obtained by Mahone between estimates of the percentage of people who have the requisite ability to succeed in occupations and the prestige ordering of occupations provides the empirical link required to approach an analysis of vocational aspiration in terms of the same guiding hypotheses which have been confirmed in experimental analysis of risk-taking and aspiration on tasks requiring ability: viz., persons strong in Achievement and weak in anxiety will prefer an intermediate degree of risk, i.e., they will set their level of aspiration so that it is realistically related to their own ability rather than having either extremely high or low aspiration relative to their ability. (McClelland, 1958; Atkinson, et al., 1960; Atkinson and Litwin, 1960; Clark, Teevan, and Riccucci, 1958).

Following Mahone's earlier analysis of realism of aspiration in college men, we obtained the information required to provide two indices of the degree of realism in the stated vocational objectives of students in the experimental and control classes. One is an index of the degree to which the level of ability required for success in the occupation to which a student aspires is congruent with his own measured ability. The other is an index of the degree to which the stated vocational aspiration is congruent with his general pattern of vocational interests.

Mahone (1960) has argued that a realistic orientation towards vocational planning should lead an individual to discover what level of ability is generally thought to be required for certain occupations and to learn about the interests, preoccupations, and style of life lived by persons in various occupations. Thus a realistic vocational objective is one likely to provide a challenge, but not an insurmountable obstacle, to a person given his own level of ability; and it is one in which happy and successful persons have interests which correspond to those of the individual in question.

Realism of Vocational Aspiration Relative to Measured Ability

To determine whether or not a vocational aspiration represents a realistic goal for an individual rather than an over-aspiration or under-aspiration, we must have some measure of the level of general ability required for the occupation and some measure of the individual's level of general ability. In the present study, 9th grade intelligence as measured by the California Test of Mental Maturity provides a measure of general ability. But there is no generally useful and definitive information concerning the level of ability required for particular occupations. So, following the procedure employed by Mahone (1960), we obtained judgments from the high school students themselves concerning the level of ability required for success in various occupations. They were asked what percentage of students in the school have sufficient general ability to attain various occupational goals. The average of these estimates does not provide an infallible index of the level of ability required, but it does produce a picture of the consensus of opinion among high school students which represents the social reality in terms of which these students make decisions concerning their own future.

Table 2.9 shows the average estimate of percentage of boys thought to have the requisite ability to attain certain occupational objectives. The rank order correlation between these estimates of ability required (or probability of success) and the prestige rank of various occupations obtained from earlier surveys by National Opinion Research Center (Lipsett and Bendix, 1953, pp. 411-426) was $-.90$. This clearly indicates, what Mahone had already found among college men, that there is a strong inverse relationship between the prestige and monetary rewards accorded persons in various occupations which define their general standing and a generally shared perception of the proportion of the population who have enough general ability to function effectively in those occupations.

In the analysis which follows, we employ the average estimate of percentage of high school boys having requisite general ability for an occupation in relation to the actual percentile rank of a boy on 9th grade intelligence to derive an index corresponding to the Goal Discrepancy Score which is traditionally employed in studies of level of aspiration. Thus, if a boy falling in the 50th percentile on intelligence (taken as our measure of general ability) aspires to the occupation of Scientist, for which the average estimate of percentage having requisite ability is 12%, the index of Goal Discrepancy would be high positive, $+38$, suggesting an unrealistically high level of aspiration. If a boy scoring at the level of the top 15% of his class in intelligence aspired to be a Scientist, the index of Goal Discrepancy would be $+3$, suggesting a much more realistic aspiration. An illustration of unrealistic under-aspiration would be the case of a boy standing at the top 5% of his class in intelligence who aspired to be a Bookkeeper, for which the average estimate of percentage having requisite ability was 46%. The index of Goal Discrepancy would then be negative, -41 .

TABLE 2.9

Average Estimates by High School Boys in 1962 (N=74) of Number of Students Out of 100 in the High School Having Sufficient General Ability to Succeed in Various Occupations

Average Estimate of % Having Ability	As Stated on Questionnaire	NORC Occupation Title	Prestige Index*
11.4	Physician (Doctor of Medicine)	Physician	93
9.4	State governor	State governor	93
14.2	College professor	College professor	89
12.2	Scientist	Scientist	89
13.5	U. S. Representative in Congress	U. S. Representative in Congress	89
23.0	Minister (or priest)	Minister	87
14.3	Lawyer	Lawyer	86
14.4	Vice President of a big business	Member of the Bd. of Directors of a large corporation	86
19.4	Musician in a symph. orchestra	Musician in a symph. orchestra	81
15.9	Author of Novels	Author of Novels	80
29.2	School teacher	Public school teacher	78
31.6	Druggist	Proprietors, managers, and officials (except farm), avg score	74.9
34.4	Electrician	Electrician	73
34.4	Newspaper reporter	Reporter on a daily newspaper	71
43.9	Jewelry store owner	Manager of a store in a city	69
46.4	Bookkeeper	Bookkeeper	68
43.1	Insurance agent	Insurance agent	68
81.0	Mail carrier	Mail carrier	66
50.0	Automobile repairman	Automobile repairman	63
52.3	Garage mechanic	Garage mechanic	62
58.9	Machinist	Machine operator in a factory	60
67.8	Dept. store salesman	Clerk in a store	58
43.5	Bank teller	Clerk in a store	58
77.1	Bus driver	Streetcar motorman	58
75.4	Night watchman	Night watchman	47

*The prestige index is derived from survey data concerning ratings of the general standing of occupations conducted by National Opinion Research Center (Reported in Bendix and Lipset, 1953, pp. 411-426).

There are obvious difficulties in the use of the students' own estimates of the ability required for various occupations, but given our interest in assessing degree of realism of vocational aspiration we could think of no better alternative than this measure which represents the social reality of the occupational hierarchy as it is communicated to him by the consensus of his peers with whom he has constant and direct contact.^{F6}

The questionnaire given each 12th grade student in the experimental class (1962) also asked him to indicate where he thought he stood in general ability in relation to 100 high school seniors. Estimates of own ability by boys correlated .78 (N=77) with the 9th grade intelligence test score and .58 (N=77) with Honor Point Index for three years of high school. This, we felt, provided ample justification for the use of 9th grade intelligence as our estimate of a student's general ability in deriving the index of goal discrepancy, i.e., the discrepancy between level of difficulty of the stated vocational aspiration and own ability.

The indices of goal discrepancy obtained for the stated vocational aspirations of 9th and 12th grade boys in the experimental class and from 12th grade boys in the control class ranged from -25 to +75 with the overall median falling at approximately +25 indicating a general tendency towards over-aspiration.

We have arbitrarily defined a realistic vocational aspiration as one for which the index of goal discrepancy is less than ± 10 percentile points in comparisons between the experimental and control classes. This means that we define as realistic an aspiration to an occupation which, according to the consensus of opinion among high school students, requires about the same level of ability as is indicated by the 9th grade intelligence test score for the individual. Both under- and over-aspiration are considered unrealistic.

Table 2.10 shows that among boys high (above the median) in intelligence, realistic vocational aspiration is significantly more frequent when resultant motivation to achieve (n Achievement-Test Anxiety) is high than when it is low in the experimental class ($\chi^2 = 4.04$, $p < .05$) but not in the control group ($\chi^2 = .26$). We had anticipated evidence of greater realism in vocational aspiration in the experimental than control class, particularly among those highly motivated to achieve. But there is no significant difference between the highly motivated boys in the two classes. Instead what we find is evidence of less realism in highly intelligent boys who score low in n Achievement-Test Anxiety in the experimental class than in the control class. Present findings concerning the relationship of realism of vocational aspiration among boys scoring above the median (115+) in intelligence in the experimental class confirms the finding reported earlier by Mahone (1960) for college men of comparable intelligence; but there is no support for our hypothesis that systematic ability grouping would enhance the realism of vocational aspirations.

TABLE 2.10

Realistic and Unrealistic Vocational Aspiration Relative to Own General Ability in 12th Grade Boys of Experimental and Control Classes

n Achievement— Test Anxiety	Experimental					Control		
	N	Aspiration, %			N	Aspiration, %		
		Over	Realistic	Under		Over	Realistic	Under
<u>High Intelligence</u>								
High	(20)	20	65	15	(24)	33	63	4
Low	(11)	55	27	18	(13)	46	54	0
<u>Low Intelligence</u>								
High	(8)	100	0	0	(15)	100	0	0
Low	(23)	100	0	0	(24)	96	0	4

n Achievement— Test Anxiety	Experimental		Control		Combined	
	N	%	N	%	N	%
<u>% Showing Realistic Aspiration (High Intelligence)</u>						
High	(20)	65	(24)	63	(44)	64
Low	(11)	27	(13)	54	(24)	42
	$\chi^2 = 4.04$		$\chi^2 = .26$		$\chi^2 = 3.04$	
	p < .05		n.s.		p < .10	

Note: Index of Goal Discrepancy derived from the difference between percentile rank of student in 9th grade intelligence and average estimate by group of percentage of students having sufficient general ability to achieve the stated vocational goal. Realistic goal discrepancy defined as within ± 10 points.

TABLE 2.11

Frequency of Stated Vocational Objectives of 12th Grade Boys in Experimental and Control Classes Related to Their Average Estimate of the Percentage of Students Having Sufficient General Ability to Achieve that Objective

n Achievement-- Test Anxiety	Estimated % Having Ability							
	Experimental				Control			
	N	1-25	26-50	50+	N	1-25	26-50	50+
<u>High Intelligence</u>								
High	(20)	75	25	0	(24)	92	8	0
Low	(11)	100	0	0	(14)	86	7	7
<u>Low Intelligence</u>								
High	(8)	87	13	0	(15)	80	20	0
Low	(23)	39	52	9	(25)	56	36	8

Among boys classified low (below the median) in intelligence, it is strikingly apparent in Table 2.10 that stated vocational objectives represent unrealistic over-aspirations on our index irrespective of differences in strength of resultant motivation to achieve. The analysis which follows will attempt to account for the general pattern of unrealistically high aspiration apparent in all boys except those high in intelligence and strong in resultant motivation to achieve.

Table 2.11 shows how frequently the stated vocational objectives of boys were judged by the group to be ones which only 25 out of 100 boys had sufficient general ability to attain (as presented earlier in Table 2.9). Practically all of the boys in both classes who were classified high in intelligence aspire to occupations which, according to the average judgment of the group, require at least top, quartile ability. Among the boys classified low (below the median) in intelligence, those high in resultant motivation to achieve aspire to occupations which, according to peers, require being in the upper quartile in general ability significantly more often than boys who are low in resultant motivation to achieve. The difference is more striking in the experimental class ($p < .05$, exact test) than in the control class ($\chi^2 = 2.37$, $p < .20$). In other words, boys who are less positively motivated to achieve and are also relatively low in intelligence tend to aim for occupations which are judged to require less ability (even though, as Table 2.10 showed, these aspirations still tend to be too high). But the less intelligent highly motivated boys aspire to the same set of ability-demanding occupations which practically all of their more intelligent peers aspire to. They, in particular, show evidence of unrealistic, wishful aspiration that is not meaningfully related to their own measured ability. Among the boys classified low in Achievement-Test Anxiety, those low in intelligence aspire to less demanding occupations less frequently than those high in intelligence in the control class ($\chi^2 = 3.75$, $p < .10$) and particularly in the experimental class ($p < .01$).

Realism in Estimating Own Ability and Difficulty of Own Vocational Objective

Are vocational aspirations unrealistically high because students overestimate their own ability? Or because some tend to underestimate (relative to their peers) the ability required for certain occupations? Table 2.12 shows that boys of low intelligence generally tend to overestimate their own general ability. Each boy's percentile standing on 9th grade intelligence was compared with his own estimated percentile standing in general ability. Approximately two-thirds of the boys above the median in intelligence give a reasonably accurate estimate of how they compare with others in general ability. But irrespective of differences in motivation, boys below the median in intelligence rarely do. They frequently overestimate their percentile standing in the class by more than 30 percentile points. Whether this means they simply do not know how they compare with others in general intelligence, cut

TABLE 2.12

Realistic and Unrealistic Estimates of Own General Ability in Twelfth Grade Boys of Experimental Class. (Discrepancy Between Estimated Percentile Rank in General Ability and Actual Percentile Rank on Ninth Grade Intelligence Test)

n Achievement- Test Anxiety	N	Points			
		Overestimate		Accurate	Underestimate
		30+	10-29	Within ±10	-11
		<u>High Intelligence</u>			
High	(20)	0%	35%	60%	5%
Low	(10)	10	30	60	0
		<u>Low Intelligence</u>			
High	(8)	63	37	0	0
Low	(23)	69	22	9	0

are unwilling to accept what they do know, or are unwilling to be candid on a signed questionnaire, their overestimation of their own ability appears to be one of the major reasons for the general pattern of over-aspiration reported by boys of lower intelligence in Table 2.10.

When each boy's own estimate of the ability required for his own stated vocational objective is compared with the average estimate of ability required there is evidence of greater accuracy than in the estimates of own ability. Table 2.13 shows that most boys give an estimate of the proportion of students who have sufficient ability to do what they aspire to do which agrees ±10 percentage points with the average group estimate. The more highly intelligent boys tend to be more accurate than those lower in intelligence ($\chi^2 = 4.55$, $p < .05$), but the difference is much less pronounced than for estimates of own relative ability.

Realism of Vocational Aspiration Relative to Estimate of Own Ability

Again following a procedure developed earlier by Mahone (1960), we investigate the question of whether or not the stated vocational aspiration appears realistic to the student himself. We are able to make this analysis only for the experimental class since all the requisite information (i.e., estimate of own ability) had not been obtained on the control class three years earlier. The index of goal discrepancy is now derived from each student's own estimate of the ability required for the occupation of his choice

TABLE 2.13

Own Estimate of Level of Ability Required for Own Vocational Choice
Compared to Consensus of Opinion. (Twelfth Grade
Boys of Experimental Class)

n Achievement- Test Anxiety	N	Underestimate Ability Required	Agree With Consensus (± 10)	Overestimate Ability Required
<u>High Intelligence</u>				
High	(18)	5%	78%	17%
Low	(10)	0	90	10
<u>Low Intelligence</u>				
High	(8)	25	62	13
Low	(19)	10	53	37

Note: The student's own estimate of % of boys having sufficient ability to achieve his stated vocational objective is compared with the average estimate by the group shown in Table 2.9.

TABLE 2.14

Subjective Realism of Vocational Aspiration of Twelfth
Grade Boys in Experimental Class

n Achievement- Test Anxiety	N	Over Aspiration	Realistic Aspiration*	Under Aspiration	Realistic
<u>High Intelligence</u>					
High	(19)	11%	58%	31%	58%
Low	(10)	30	70	0	70
<u>Low Intelligence</u>					
High	(8)	37	50	13	50
Low	(17)	65	23	12	23

*Realistic aspiration defined as within ± 10 points.

Note: The index of goal discrepancy is obtained from the difference between a boy's own estimate of his general ability (% rank) and his estimate of the % of students having sufficient ability to achieve his stated objective.

and his estimate of his own ability. Mahone (1960) found that college men who were strong in resultant motivation were subjectively more realistic in vocational aspiration than those low in resultant motivation to achieve. Our analysis of the experimental class does not replicate this earlier finding. None of the motivational comparisons are statistically significant in Table 2.14. Table 2.14 shows that 70% of the boys of high intelligence who are low in resultant motivation to achieve appear realistic in their own eyes. That is, the difference between their estimates of the ability required for the occupation of their choice and their own ability is less than ± 10 percentage points. In Table 2.10, using the average judgment of the group to define the level of ability required for an occupation and the 9th grade intelligence test score to define their level of ability, only 27% of this group were classified realistic in vocational aspiration. (We should recall, at this point, the generally strong scholastic performance of this group of students in the experimental class as measured by achievement test scores and grades in high school which may be the source of heightened estimates of their own ability. This would account for the discrepancy in results using 9th grade intelligence as the measure of a student's general ability (Table 2.10) and his own estimate (Table 2.14).)

The boys classified low in intelligence are also more frequently classified realistic in vocational aspiration in terms of this completely subjective index in Table 2.14 than in Table 2.10. Thus it would appear that the combination of mis-estimates of own ability relative to others and of ability required for success in an occupation makes it possible for a student to believe himself realistically oriented toward a future vocation, when in fact he is not.

Development of Realistic Vocational Aspiration Between Ninth and Twelfth Grades

We return to the index of Goal Discrepancy of the stated vocational aspiration based on the average estimate of ability required in occupations by high school seniors of the experimental class and ability as measured by 9th grade intelligence test to compare the degree of realism of aspirations stated by boys in the experimental class in the 9th grade and the same boys in the 12th grade. Among the boys classified high in intelligence, there is no tendency for those strong in motivation to achieve to be more realistic about vocational plans in 9th grade than those weaker in motivation to achieve. About 45% of the boys are realistically oriented at that time. However, by the 12th grade 65% of the group that is high in resultant motivation to achieve are classified realistic in vocational aspiration, but only 27% of those low in resultant motivation to achieve are classified realistic in vocational plans. The latter difference, as previously stated, is statistically significant. (The trend is the same when 9th grade index of resultant motivation to achieve, not reported here, is employed.)

In other words, there is some evidence that the difference in degree of realism of vocational aspiration attributable to a difference in achievement-related motivation in highly intelligent boys develops during the three year period between 9th and 12th grade as greater emphasis is given the matter of career planning. Boys low in intelligence show little change in the tendency to have unrealistically high vocational aspirations between 9th and 12th grades.

A sharper analysis of change in degree of realism of vocational plans between 9th and 12th grades is afforded by comparison of the magnitude of the indices of goal discrepancy obtained on the two occasions. Results show that 50% of the highly intelligent boys who are strongly motivated to achieve become more realistic (i.e., have smaller goal discrepancy indices) in 12th grade as compared with only 9% of the group comparable in intelligence who are low in resultant motivation to achieve (or more anxious). The difference is statistically significant in a one-tail exact test ($p < .07$). Among boys classified low in intelligence, 29% of those low and none of those high in resultant motivation to achieve in our restricted sample show a change towards greater realism, but the difference between motivation groups is insignificant.

Closer analysis shows that the changes of highly intelligent boys who are strong in achievement motivation are more meaningful in that they represent reductions in goal discrepancy which lead to classification as realistic in 12th grade. Changes among the boys of lower intelligence who are low in motivation represent changes from substantial over-aspiration to somewhat less substantial over-aspiration in 12th grade.

Finally, when 9th and 12th grade vocational aspirations of the experimental group are compared in terms of level of difficulty (as defined by the ordering of occupations in Table 2.9), it is apparent that there is a general rise in the level of vocational aspiration for all groups except the boys classified low in intelligence and low in resultant motivation to achieve. Between 35% and 50% of all groups show a higher level of aspiration in 12th grade than 9th grade. The increase is balanced for less intelligent boys who are weakly motivated to achieve by equally frequent drops in aspiration.

Realism of Vocational Aspiration Relative to Interest Pattern

High school seniors in both the experimental and control classes were given the Strong Vocational Interest Blank to provide an index of the degree of congruence between stated vocational objective and strength of interest in that particular occupation and related occupations. If the vocational objective was one supported by strong interest, as measured by SVIB, it was classified realistic. If there was little or no evidence of a strong pattern of interests in the area of the stated vocational objective, it was classified unrealistic. Mahone (1960) had previously shown that strength of achievement

motivation in college men was positively related to this index of realism of vocational objective.

The index adapted from Mahone allows classification of students into one of six categories ranging from very realistic to very unrealistic. Certain modifications were necessary because the data in terms of which students were classified was somewhat different in this study. Mahone employed two classes of data to determine degree of realism: (1) the letter grade obtained by an individual on the occupational interest in the Strong test which corresponded to his stated vocational objective; (2) clinical judgments as to the "appropriate" major and minor area of interests for a student having a particular occupation as his objective.

In the present study, it was possible to identify an area of occupational interest on the Strong test which contained the stated vocational objective of the student. This would be an "appropriate" major area of interest for him. In addition, the students had been asked to state second and third choices of vocational objectives. Using the second vocational objective, it was possible to identify what would be an appropriate minor area of interest for the student.

Table 2.15 describes the criteria (adopted from Mahone) which were employed to classify each student in terms of six categories representing degree of realism of vocational objective relative to the student's pattern of interests. The grade assigned for each occupation on the Strong test represents the degree to which the interest preferences of an individual correspond to those of successful persons in that particular occupation. Thus, a grade of A means the individual has likes and dislikes that are very similar to those of persons in an occupation; lower grades imply lower correspondence of interest patterns.

The various occupations are clustered into ten areas of interest on the Strong test. Thus, on the basis of grades attained within an area, the primary occupational interest of an individual can be identified. An area is considered a primary interest if the majority of interest scores on occupations in that area are A and B+. Secondary interest is indicated if the majority of scores are B+ and B. Tertiary interest is indicated if the major scores are B and C+. If the majority of scores are at a chance level, the area is scored unrelated. If scores in any occupational area were extremely low (below the chance level), it was scored a rejected area. This means, in effect, that the person has interests opposite to those of persons who are happy and successful in that type of occupation.

Further details of the procedures employed to derive the index of congruence between stated aspiration and vocational interests are stated in Appendix A. As should be clear from Table 2.15 a student was classified most realistic in his vocational aspiration if he scored A or B+ on interest

TABLE 2.15

Criteria Adapted from Mahone (1960) to Classify Stated Vocational Objectives as Realistic or Unrealistic as a Function of Degree of Congruence with Vocational Interests Assessed by the Strong Interest Blank*

Category	Minimum Requirements for Classification
Realistic	1. A or B-plus on key (if any); primary pattern in major interest area; secondary pattern in minor interest area (if any). 2. A or B-plus on key (if any); primary pattern in major interest area; unrelated pattern in minor interest area. 3. Any one of the three following minimum requirements: a. B on key; primary pattern in major area; unrelated pattern in minor area. b. B-plus on key; unrelated pattern in major area, secondary pattern in minor area. c. A on key; unrelated pattern in both major and minor areas.
Unrealistic	4. Any one of the three following minimum requirements: a. B-plus on key; unrelated pattern in major area; no minor area. b. B on key; secondary pattern in major area; no minor area. c. No key; secondary pattern in major area; no minor area. 5. Either one of the following minimum requirements: a. B on key; unrelated pattern in both major and minor areas. b. B-minus on key; secondary pattern in either major or minor areas. 6. All other patterns of scores.

*We are indebted to Stuart Karabenick for working out these criteria in the present data.

in that particular occupation, had his primary pattern of interests in the area of occupations containing his vocational objective, and had a secondary pattern of interests in the area of occupations containing his second stated vocational goal. He was classified unrealistic if there was less congruence than is described under Category No. 3 in Table 2.15.

Table 2.16 compares 12th grade boys in the experimental and control classes on this index of realism of vocational aspiration. There is very little difference between comparable motivation groups in the experimental and control classes among boys low in intelligence. But there are appreciable differences between experimental and control groups of boys high in intelligence. Those exposed to ability grouping beginning in junior high school and the opportunity to participate in accelerated courses during high school (the experimental class) have vocational objectives that are more frequently congruent with their pattern of interests than boys in the control class. The difference is most striking among the highly intelligent boys who are high in resultant motivation to achieve. In the experimental class, 73% of this group as compared to only 29% in the control group are classified realistic in vocational objective ($\chi^2 = 8.71$, $p < .01$). A similar trend is apparent among boys of high intelligence who are low in resultant motivation to achieve, but with such a restricted sample it is not statistically significant.

In the experimental class, boys who are high in intelligence and strongly motivated to achieve are more often classified realistic in vocational aspiration than boys of comparable high intelligence who are low in resultant motivation to achieve. But the difference evaluated by Fisher's exact test is not significant. There is no comparable motivational difference among highly intelligent boys in the control class, nor are the differences among boys of lower intelligence in either class statistically significant.

The Achievement Risk Preference Scale

We investigate the potential usefulness of the Achievement Risk Preference Scale (ARPS) as a measure of resultant motivation to achieve in two ways. First, we examine the relationship between scores obtained by high school seniors on this objective paired-comparison test with strength of resultant motivation to achieve (n Achievement-Test Anxiety) as assessed by measures of established validity. Then we proceed to employ the ARPS as if it were an adequate measure of achievement-related motivation in the same type of analyses already reported using n Achievement-Test Anxiety as the index of motivation. We are concerned about the degree of congruence in results using the established measures and this new test, the validity of which is still an open question. We proceed, as before, making separate analyses for high

TABLE 2.16

Realism of Vocational Aspiration of Twelfth Grade Boys in Experimental and Control Classes Assessed by Degree of Congruence Between Stated Vocational Objectives and Strength of Occupational Interest as Measured by Strong Vocational Interest Blank

Congruence Classification*	Experimental		Control	
	High Motivation**	Low Motivation	High Motivation	Low Motivation
<u>High Intelligence</u>				
Realistic				
1	2	2	4	2
2	6 (73%)	1 (50%)	1 (29%)	0 (27%)
3	8	1	2	1
Unrealistic				
4	3	1	5	1
5	1	0	2	1
6	2	3	10	6
<u>Low Intelligence</u>				
Realistic				
1	1	2	1	1
2	1 (25%)	1 (43%)	0 (16%)	2 (40%)
3	0	3	2	3
Unrealistic				
4	2	4	3	4
5	1	2	1	1
6	3	2	12	4

*See Table 2.15 for classification scheme.

**n Achievement-Test Anxiety.

school boys and girls for reasons stated earlier. Because the ARPS was developed after this study had been initiated in 1959, our analysis is confined to the experimental class which took the test during the senior year in high school in 1962.

Relation of ARPS to n Achievement-Test Anxiety

Table 2.17 shows that the score attained on ARPS by 12th grade boys in the experimental class is positively related to both intelligence and the

index of resultant motivation to achieve derived from 9th grade n Achievement and Test Anxiety Scores.

Ignoring differences in-motivation we find that boys above the median in intelligence significantly more often score above the median on ARPS than boys below the median in intelligence ($\chi^2 = 5.51$, $p < .02$). Ignoring differences in intelligence, we find that boys who are high in n Achievement-Test Anxiety in 9th grade significantly more often score high on ARPS in 12th grade ($\chi^2 = 5.35$, $p < .05$). This result compares favorably with the relationships between resultant motivation to achieve as assessed in 9th and 12th grades (Table 2.8).

TABLE 2.17

Score on Achievement Risk Preference Scale Related to Intelligence and Resultant Motivation to Achieve in Boys of the Experimental Class

n Achievement- Test Anxiety	Intelligence	N	% Above Median on ARPS
<u>9th Grade</u>			
High	High	(20)	70
Low	High	(11)	45
High	Low	(9)	44
Low	Low	(20)	25
<u>12th Grade</u>			
High	High	(21)	62
Low	High	(11)	64
High	Low	(8)	50
Low	Low	(25)	28

But Table 2.17 which also relates ARPS score to the index of resultant motivation to achieve based on 12th grade n Achievement and Test Anxiety scores looks very much like the relationship obtained between 12th grade n Achievement-Test Anxiety and measures of scholastic performance. Highly intelligent boys tend to score high on ARPS irrespective of differences in n Achievement-Test Anxiety. However, those lower in intelligence who are high in resultant motivation to achieve more frequently tend to score high on ARPS than those who are low in resultant motivation to achieve. The difference, however, is not significant ($\chi^2 = .52$). The trend is similar to that shown in Tables 2.6 and 2.7, where the 12th grade index of resultant

motivation to achieve predicted a difference in scholastic performance among those below the median intelligence but not among those high in intelligence.

Ignoring the difference in intelligence, the relationship of ARPS to 12th grade n Achievement-Test Anxiety is not as strong as the relationship to 9th grade n Achievement-Test Anxiety ($\chi^2 = 2.51$, $p < .20$).

Relation of ARPS to Scholastic Performance

Table 2.18A shows how score on the Achievement Risk Preference Scale relates to 9th grade achievement tests in reading and arithmetic. Holding intelligence constant boys who score high on ARPS in 12th grade perform better on both tests than boys who score low on ARPS. When compared with Table 2.6, it is particularly apparent that ARPS provides sharper predictions of differential performance on the reading test than n Achievement-Test Anxiety but a less adequate prediction of the performance level of less intelligent boys in the experimental class on the arithmetic test than n Achievement-Test Anxiety.

Table 2.18B may be compared with Table 2.7. The correspondence of results employing n Achievement-Test Anxiety and ARPS as the basis for inferring differences in strength of resultant motivation to achieve is striking. The conclusions drawn from the two tables concerned with high school performance of boys in the experimental class would be the same.

TABLE 2.18

Score on Achievement Risk Preference Scale Related to Performance on Ninth Grade Achievement Tests and Honor Point Index in High School.
Boys of Experimental Class Only.

ARPS	Intelligence	A. Test							
		California Reading				World Book Arithmetic			
		N	H*	M	L	N	H*	M	L
High	High	(20)	60%	40%	0%	(20)	50%	50%	0%
Low	High	(12)	25	75	0	(12)	33	67	0
High	Low	(11)	0	64	36	(11)	0	54	46
Low	Low	(21)	0	38	62	(21)	0	48	52

B. Honor Point Index									
		Sophomore Year				Three Years			
		N	H*	M	L	N	H*	M	L
High	High	(20)	45%	55%	0%	(20)	55%	45%	0%
Low	High	(12)	42	58	0	(12)	42	58	0
High	Low	(11)	0	64	36	(11)	0	73	27
Low	Low	(22)	0	41	59	(21)	0	38	62

*Distribution of scores divided at highest and lowest quartiles.

Relation of ARPS to Realism of Vocational Aspiration

Table 2.19 shows that ARPS does not relate significantly to realism of vocational aspiration relative to own ability as did n Achievement-Test Anxiety in Table 2.10, though the obtained result is in the expected direction. The result concerning subjective realism of vocational aspiration shown in Table 2.19 is essentially the same as that reported in Table 2.14 with n Achievement-Test Anxiety.

When we consider the question of realism of vocational aspiration measured in terms of the degree of agreement between the stated level of aspiration and the pattern of vocational interests as measured by the Strong Vocational Inventory using ARPS as the basis for influence concerning strength of resultant motivation to achieve (Table 2.20), we find even larger differences between subgroups in the predicted direction than were reported in Table 2.16 which employed n Achievement-Test Anxiety as the measure of motivation. Among the highly intelligent boys in the experimental class who scored high on ARPS, 89% were classified realistic in vocational aspiration relative to own vocation interests as compared with only 30% who scored low on ARPS ($p < .01$, exact test). The comparable figures when n Achievement-Test Anxiety was employed in Table 2.16 were 73% and 50%.

Summary

The relationship of scores attained on the paired comparison test of preference for intermediate risk in sports and interest in other everyday achievement activities to n Achievement and Test Anxiety scores and the relationship of ARPS scores to measures of scholastic performance and vocational aspiration encourages the view that ARPS is sensitive to individual differences in strength of resultant motivation to achieve among 12th grade boys. One complicating factor in the use of this test is the fact that scores are positively related to both intelligence and n Achievement-Test Anxiety. We cannot, at this time, explain why scores obtained by boys on ARPS in the 12th grade are more strongly related to n Achievement-Test Anxiety assessed in the 9th grade than in the 12th grade. But in light of the potential value of an easily administered and easily scored test of individual differences in achievement-related motivation, we are encouraged by the pattern of results obtained from 12th grade boys to pursue further developmental work on this test.

TABLE 2.19

Score on Achievement Risk Preference Related to Percentage of Boys
in Experimental Class Classified Realistic in Vocational
Aspiration Relative to Own Ability

ARPS— Intelligence	% Classified Realistic			
	Relative to Own Measured Ability*		Subjective Index of Goal Discrepancy**	
	N	%	N	%
High-High	(19)	53	(18)	61
Low-High	(11)	45	(11)	64
High-Low	(9)	0	(11)	45
Low-Low	(19)	0	(14)	22

*See Table 2.10.

**See Table 2.14.

TABLE 2.20

Score on Achievement Risk Preference Scale Related to Realism of
Vocational Aspiration Relative to Vocational Interests in
Boys of the Experimental Class

Congruence Classification**	High Intelligence		Low Intelligence	
	High ARPS	Low ARPS	High ARPS	Low ARPS
Realistic				
1	4	0	0	2
2	6 (89%)*	1 (30%)	1 (18%)	0 (13%)
3	7	2	1	0
Unrealistic				
4	1	2	3	2
5	1 (11%)	1 (70%)	0 (82%)	2 (87%)
6	0	4	6	9

*Compare with Table 2.16.

**See Table 2.15 for classification scheme.

Discussion of Results for Girls

Characteristics of Girls Selected for Accelerated Sections in Junior High School

The analysis parallels that already presented for boys. Comparisons are based on distributions of 9th grade intelligence and motivation scores of girls.

Table 2.21 shows that girls selected for accelerated classes were significantly higher in intelligence ($\chi^2 = 27.85$, $p < .001$), significantly lower in Test Anxiety ($\chi^2 = 7.08$, $p < .01$), and significantly higher in resultant motivation to achieve, i.e., n Achievement-Test Anxiety ($\chi^2 = 11.94$, $p < .001$) than girls in regular junior high school sections. There is no difference between the two groups in n Achievement ($\chi^2 = .49$). Nor are 9th grade n Achievement and Test Anxiety scores significantly related among the girls ($\chi^2 = .46$).

TABLE 2.21

Girls in Accelerated and Regular Junior High School Sections Compared
in Terms of Ninth Grade Intelligence (California Mental Maturity)
and Achievement-Related Motivation

Sections	N	% Above Combined Median Score			
		Intelligence	n Achievement	Test Anxiety	n Achievement-Test Anxiety
Accelerated	(43)	81	49	35	70
Regular	(62)	29	42	61	35
		$\chi^2=27.85$	$\chi^2=.49$	$\chi^2=7.08$	$\chi^2=11.94$
		$p < .001$	$p \text{ n.s.}$	$p < .01$	$p < .001$

The Stability of Achievement-Related Motivation From Ninth to Twelfth Grade

Table 2.22 presents a comparison of relative standing of girls on n Achievement and Test Anxiety in 9th and 12th grades. There is clearly a

marked consistency between Test Anxiety scores obtained on the two occasions which is reflected in a product moment correlation of .56 (N=96). There is, however, no evidence that relative standing on n Achievement is stable among girls between 9th and 12th grades. The fairly striking tendency for girls who have very high scores in 9th grade to fall below the median in 12th grade is reflected in a product moment correlation of -.13 (N=86) between scores on the two occasions. Further analysis showed this negative association most marked among girls in regular sections.

TABLE 2.22

Stability of n Achievement and Test Anxiety in Girls of the Experimental Class Tested in Ninth and Twelfth Grades

	% Scoring High (Above Median) in 12th Grade			
	n Achievement		Test Anxiety	
	N	%	N	%
<u>Ninth Grade Measure</u>				
High (above median)	(40)	40	48	69
Low (below median)	(47)	57	48	31
		$\chi^2=2.63$		$\chi^2=13.50$
		$p < .20$		$p < .001$
<u>Thirds</u>				
High	(27)	33*	33	78
Mid	(30)	57	33	55
Low	(30)	57	30	17
		$\chi^2=4.05$		$\chi^2=22.38$
		2 d.f.		$p < .001$
		$p < .20$		
<u>Extreme Quartiles</u>				
Highest	(23)	30	23	87
Mid	(39)	59	49	47
Lowest	(25)	52	24	21
		$\chi^2=4.81$		$\chi^2=20.90$
		2 d.f.		$p < .001$
		$p < .10$		

*Comparable percentages for girls in accelerated and regular sections treated separately were: Accelerated = 43, 46, 50; Regular = 23, 65, 63.

There is, at this time, no completely satisfactory explanation of why we should find no evidence of stability in n Achievement scores of girls. Mead (1949) has emphasized that it is in this period of an American girl's life that she is likely to relinquish competitive achievement-oriented behavior in adapting to the requirements of the traditional female role. Whatever the reason, it is obvious that the n Achievement scores obtained from 12th grade girls do not provide an index of motivation that appears characteristic of the whole period, 9th to 12th grade. Therefore we are not justified in using either the 12th grade n Achievement scores nor the index of resultant motivation to achieve derived from 12th grade scores in our analysis of results for girls.

The whole analysis shall be conducted in terms of Test Anxiety scores obtained in the 12th grade. The stability of this measure allows us to assume that at least one of the components of resultant motivation to achieve is a stable characteristic of girls during the period studied.

Composition of Experimental and Control Groups

Table 2.23 shows the composition of experimental and control groups of girls classified in terms of intelligence and Test Anxiety score obtained in 12th grade. The four groups within boxes, in the experimental class, constitute the experimental groups. Girls having IQ's below 112 but assigned to accelerated sections in junior high school and girls having IQ's of 112 or above who were not assigned to accelerated sections were eliminated from the subsequent analysis of results.

Girls in the experimental class fall into two categories: (a) those above the median in intelligence as measured in 9th grade who had participated in accelerated mathematics sections in junior high school and who had other acceleration experiences in high school; (b) those below the median in intelligence who were members of regular sections in junior high school and non-accelerated classes in high school.

In the control class, girls of high and low IQ were members of the same sections in junior high school and more likely, than in the experimental groups, to be in the same classes also in high school.

The comparability of experimental and control groups in 9th grade intelligence is shown in Table A.1 of Appendix A.

TABLE 2.23

Girls in Experimental and Control Classes Classified in Terms
of Ninth Grade Intelligence (California Mental Maturity)
and Twelfth Grade Test Anxiety*

Test Anxiety	Accelerated		Regular	
	Intelligence			
	High (112+)	Low (111-)	High (112+)	Low (111-)
<u>Experimental Class</u>				
Low	26	5	6	13
High	9	4	12	24
<u>Control Class</u>				
Low	28			25
High	16			35

*All girls for whom Test Anxiety scores were obtained in the 12th grade are included in the table. Subgroups within boxes constitute the experimental and control groups in later comparisons.

Scholastic Achievement in Junior High School

We are guided by the hypothesis that achievement-related motivation will be heightened by ability grouping. This should lead to a greater enhancement of performance in those who are disposed to experience relatively little anxiety about failure than in those who experience strong anxiety about failure. We consider first performance on the two achievement tests given in January of the 9th grade: The World Book Arithmetic Test and the Reading Test of the California Achievement Test. Scores obtained for the control and experimental classes are stated in terms of national norms and are therefore comparable. Scores obtained by girls in the two years were combined in a single distribution and common breaking points were employed to define the upper and lower quartiles on each of the two achievement tests. The results are reported descriptively in Table 2.24.

General Effects of Differences in Intelligence and Anxiety

The results for the two classes are combined in the right hand columns of Table 2.24 in which the expected effects of both intelligence and anxiety

TABLE 2.24

Performance of Girls in Experimental and Control Classes on Ninth Grade
World Book Arithmetic Test and California Reading Test
(Combined Distribution of Scores Divided at the Upper and Lower Quartiles)

Test Anxiety	Intelligence	N	Control, %			N	Experimental, %			N	Combined, %		
			H	M	L		H	M	L		H	M	L
Arithmetic (World Book)													
Low	High	(21)	33	57	10	(25)	72	28	0	(46)	55	41	4
High	High	(14)	21	64	15	(8)	62	38	0	(22)	36	55	9
Low	Low	(19)	11	47	42	(13)	0	92	8	(32)	6	66	28
High	Low	(30)	7	50	43	(24)	4	41	54	(54)	6	46	48
Reading (California)													
Low	High	(22)	41	54	5	(25)	60	40	0	(47)	51	47	2
High	High	(14)	36	57	7	(9)	33	67	0	(23)	35	61	4
Low	Low	(19)	5	69	26	(13)	8	61	31	(32)	6	66	28
High	Low	(30)	0	57	43	(24)	8	33	59	(54)	4	46	50

on scholastic achievement are apparent. When intelligence is high, upper quartile performance on both reading and arithmetic tests is more frequent among girls who are low in anxiety than among those who are high in anxiety, but neither difference is statistically significant. On the reading test, 51% of girls low in anxiety score in the upper quartile while only 35% of girls high in anxiety score that high ($\chi^2 = 1.65$, $p < .20$). The result is similar for the arithmetic test on which 55% girls low in anxiety and 36% of girls high in anxiety obtained scores in the upper quartile ($\chi^2 = 1.93$, $p < .20$).

Among girls low in intelligence the effect of anxiety is considerably greater and the effect is most apparent when one compares the percentage scoring in the lowest quartile on the two tests. On the reading test, 50% of girls high in anxiety as compared with 28% of girls low in anxiety fall in the lowest quartile ($\chi^2 = 3.95$, $p < .05$). On the arithmetic test, 48% of girls high in anxiety and 28% of girls low in anxiety score in the lowest quartile ($\chi^2 = 3.34$, $p < .10$).

In summary, when intelligence is high (112 or above) low anxiety tends to increase the possibility of outstanding performance; when intelligence is low (111 or below) low anxiety reduces the chance of very low performance. These differences confirm the expected effects of differences in intelligence and anxiety on scholastic performance and correspond to results obtained for boys.

Effects of Differences in Intelligence and Anxiety in Experimental Versus Control Class

Table 2.24 shows that highly intelligent girls in the experimental class ($N=33$) more frequently scored in the upper quartile on the arithmetic test, irrespective of any difference in anxiety ($\chi^2 = 11.50$, $p < .001$), than highly intelligent girls in the control class ($N=35$). There is, however, no evidence to support the hypothesis that girls who are low in anxiety would show the greatest improvement under ability grouping.

On the reading test, the results are somewhat different. Highly intelligent girls who are high in anxiety attain upper quartile test scores equally often in experimental and control classes. Among girls low in anxiety, however, those in the ability grouped class more frequently attain upper quartile test score performance than those in the control class ($\chi^2 = 1.71$, $p < .20$). This result is consistent with the hypothesis that ability grouping should enhance performance most among those who are low in anxiety, but we can offer no explanation of why it should occur on the reading test when the junior high school class had been grouped in arithmetic sections.

Among girls of low intelligence, those low in anxiety less frequently scored in the lowest quartile on arithmetic in the experimental than the control class. In the control group, 42% of those low in anxiety scored in the lowest quartile on arithmetic; only 8% of the comparable group in the experimental class scored that low ($\chi^2 = 2.98$, $p < .10$). Among the highly anxious girls having low IQ's there is no clear effect on arithmetic performance that is attributable to ability grouping.

On the reading test, girls of low intelligence in the control class less frequently score in the lowest quartile irrespective of the difference in anxiety but the difference between experimental and control groups is not significant.

Summary

Except for anxious girls of low intelligence, performance on the 9th grade achievement test in arithmetic generally tends to be higher among girls who have experienced ability grouping in junior high school. Comparable differences are not obtained on the California reading test.

There is little evidence to support the general hypothesis that girls who are low in anxiety would show the greatest improvement under ability grouping. But neither is there any tendency for greater improvement to be evident in the performance of highly intelligent students who are high in anxiety, the unanticipated trend reported in the earlier analysis of results for boys.

Among girls of low intelligence, those low in anxiety score higher on arithmetic in the experimental class than in the control class as predicted. The trend is reversed for highly anxious girls, though not significantly. These results are not duplicated on the reading test.

Scholastic Achievement in High School

Table 2.25 shows the relationship between intelligence and Test Anxiety and Honor Point Index attained in the sophomore year of high school and for all three years of high school. The first set of comparisons are based on division of the combined distributions from the two classes at the upper and lower quartile (Section A). The second set of comparisons are based on division of the separate distributions of Honor Point Indices of the two classes (Section B).

The results shown in Section A of Table 2.25 show the generally expected effects of both intelligence and anxiety on scholastic performance during

TABLE 2.25

High School Performance (Honor Point Index) of Girls
in Experimental and Control Classes

Test Anxiety- Intelligence	N	Control, %			N	Experimental, %			N	Combined, %		
		H	M	L		H	M	L		H	M	L

A. Combined distribution of indices from two classes divided at the extreme quartiles.

Sophomore Year												
Test Anxiety- Intelligence	N	Control, %			N	Experimental, %			N	Combined, %		
		H	M	L		H	M	L		H	M	L
Low-High	(27)	52	44	4	(26)	54	46	0	(53)	53	45	2
High-High	(15)	33	47	20	(9)	33	45	22	(24)	33	46	21
Low-Low	(22)	9	77	14	(13)	0	70	30	(35)	6	74	20
High-Low	(32)	9	47	44	(24)	4	50	46	(56)	7	48	45
Three Years High School												
Low-High	(28)	43	53	4	(26)	62	38	0	(54)	52	46	2
High-High	(16)	31	31	38	(9)	45	33	22	(25)	36	32	32
Low-Low	(25)	8	80	12	(13)	8	61	31	(38)	8	74	18
High-Low	(35)	3	51	46	(24)	8	33	59	(59)	5	44	51

B. Separate distribution for each class divided at extreme quartiles.

Sophomore Year												
Test Anxiety- Intelligence	N	Control, %			N	Experimental, %			N	Combined, %		
		H	M	L		H	M	L		H	M	L
Low-High	(27)	52	44	4	(26)	54	46	0	(53)	53	45	2
High-High	(15)	33	40	27	(9)	33	45	22	(24)	33	42	25
Low-Low	(22)	9	73	18	(13)	0	69	31	(35)	6	71	23
High-Low	(32)	9	47	44	(24)	4	50	46	(56)	7	48	45
Three Years High School												
Low-High	(28)	54	43	3	(26)	46	54	0	(54)	50	48	2
High-High	(16)	38	25	38	(9)	33	45	22	(25)	36	32	32
Low-Low	(25)	12	76	12	(13)	8	62	30	(38)	11	71	18
High-Low	(35)	8	46	46	(24)	4	38	58	(59)	7	42	51

the sophomore year. Among the highly intelligent girls in the two classes combined, those low in anxiety more frequently stand in the upper quartile than those high in anxiety ($\chi^2 = 2.52$, $p < .20$). Lowest quartile performance is more characteristic of the highly anxious girl who is low in intelligence than the less anxious girl ($\chi^2 = 5.74$, $p < .02$).

Similar motivational effects are apparent in the Honor Point Index attained in three years of high school work by the two classes combined. Among girls low in intelligence, the difference between high and low anxiety groups is statistically significant ($\chi^2 = 10.30$, $p < .01$). Among girls high in intelligence, the trend favoring those low in anxiety is not statistically significant ($\chi^2 = 1.72$, $p < .20$).

When the combined distribution of honor point indices attained by experimental and control groups is divided into quartiles (Section A) the attainments during sophomore year of experimental and control groups of comparable intelligence and motivation are seen to be very comparable. On the three year honor point index, however, those high in intelligence in the experimental class generally fall in the upper quartile more frequently than their motivational equals in the control class. Neither of the differences taking high and low anxiety groups separately is statistically significant. But the combined effect shows a difference between highly intelligent girls in the experimental class ($N=35$) and control class ($N=34$) ($\chi^2 = 2.68$, $p < .20$).

Among the less intelligent students, just the reverse trend is apparent. That is, those in the experimental class ($N=37$) more frequently fall in the lowest quartile than those in the control class ($N=60$) ($\chi^2 = 2.80$, $p < .10$). The trend is the same for those high and low in anxiety.

In order to eliminate any artifactual effect that might be attributable to different grading practices unintentionally introduced in connection with the ability-grouping program, Section B of Table 2.25 considers high and low performance relative to the distribution of grades assigned to a given class. The results are very similar to those presented in Section A. Effects of anxiety are apparent in both experimental and control classes when intelligence is held constant. But there is no evidence that differences in performance attributable to motivational differences would be more marked in the ability-grouped class. If anything, the differences associated with motivation are slightly greater in the control class. This was even more apparent in the analysis of results for boys.

Summary

While some differences between experimental and control classes are observed, none of them provide any evidence to support the hypothesis that ability grouping would tend to enhance performance more among students low in anxiety than those who are strong in anxiety.

National Merit Examination

As already reported in the discussion of results for boys, the National Merit Examination was taken on a voluntary basis in 1962 (the experimental class). As a consequence our analysis is restricted to comparisons involving the small number of students above the median in intelligence who took the test in 1962 with their control group. Table A.2 of Appendix A shows that girls in the experimental class who took the examination are significantly higher in both intelligence and honor point index attained in three years of high school than those who did not. The differences observed in Table 2.26 must be conservatively evaluated in light of the upwardly biased and restricted size of the samples available from the experimental class.

TABLE 2.26

National Merit Examination Performance of Girls Classified High in Intelligence in the Experimental and the Control Classes
(The Combined Distribution of Scores Obtained From the Two Classes is Divided at the Median on Each Test)

Test Anxiety	% Scoring Above Median			
	Control (1959)		Experimental (1962)	
	N	%	N	%
	<u>English</u>			
Low	(24)	58	(18)	33
High	(14)	43	(4)	50
	<u>Mathematics</u>			
Low	(24)	42	(18)	94
High	(14)	7	(4)	75
	<u>Social Studies</u>			
Low	(24)	63	(18)	61
High	(14)	43	(4)	0
	<u>Natural Science</u>			
Low	(24)	42	(18)	56
High	(14)	29	(4)	25
	<u>Word Usage</u>			
Low	(24)	54	(18)	50
High	(14)	57	(4)	0
	<u>Total Comprehensive</u>			
Low	(24)	50	(18)	67
High	(14)	29	(4)	25

The overall superiority of the ability-grouped (N=22) class relative to the control class (N=38) is apparent only on the mathematics test ($\chi^2 = 16.03$, $p < .001$). This result is at least congruent with the accelerated experience this group had in mathematics in junior high school. None of the other differences between experimental and control classes are statistically significant nor do they consistently favor one of the classes.

Realism of Vocational Aspiration

The same procedures were employed to evaluate the realism of vocational aspiration in boys and girls except for the difference in the content of the occupations listed on the questionnaire presented to girls (Appendix A). The way in which various indices were derived has already been explained in the discussion of results for boys. A vocational aspiration is considered realistic, if: (a) the individual's level of general ability as measured by an intelligence test in 9th grade (percentile rank) is less than ± 10 percentage points from the average level of ability judged by girls to be required for the stated vocational objective; (b) the estimate of own ability given by a student is less than ± 10 percentage points discrepant from her own estimate of the level of ability required for her stated vocational aim (subjectively realistic); and (c) the student's vocational interests as measured by the Strong Vocational Interest Blank are congruent with the stated vocational goal.

It is obvious that these criteria for "realism" of vocational aspiration are much less appropriate for girls than boys. Virtually every boy must eventually choose or drift into some occupation. He, in other words, should be very much involved in the choice among the various occupations we have presented or the invitation to add his own choice to the list if it is not already present. But this is not necessarily true for many girls whose long-term vocational objective is that of wife and mother. Since most girls marry and establish families in their late teens or early twenties, whatever their level of ability, the choice of a professional career is not in a broader sense "realistic" since in most cases marriage and children would impede progress towards some occupational objective. It is, moreover, probable that vocational plans are abandoned with very little reluctance by women who marry before their plan has eventuated. A man's success may be generally evaluated by the level of occupation he has attained. But this is a less pertinent criterion for women. The achievement goals for many (or most) women might most reasonably be expected to involve being a good wife and mother, and making a successful marriage which in part is defined by the occupational success of the husband. In the absence of relevant data, one might guess that for most women achievement motivation would be better satisfied by being married to the president of a large industrial complex than by being president herself.

We do not question the fact that some women are highly motivated to achieve in some vocation, but this still seems to be atypical on the American scene. It is the conflict involved in this problem to which Margaret Mead (1949) has called attention. And it is this problem which French and Lesser (previously cited) have undertaken to analyze in the context of empirical research on achievement motivation. For these reasons, we view our examination of data pertaining to vocational aspiration in girls as essentially exploratory. We feel that the data we have collected from high school girls are not fully appropriate as they were for boys.

Realism of Vocational Aspiration Relative to Ability

Girls in the experimental class were presented a list of occupations and asked: How many out of 100 students in this school have the amount of general ability required for each of the occupations? The average of these estimates, shown in Table 2.27, is taken as the consensus of opinion or social reality that is expected to influence decisions concerning vocational choice. As shown in Table 2.27, the occupations included in the list represent those more commonly chosen by women than by men (e.g., nurse, librarian, school teacher).

An index of goal discrepancy was derived in the same manner as it was for boys. If a girl falling in the 50th percentile on general intelligence aspired to the occupation of school teacher, for which the average estimate of percentage having requisite ability is 31%, the index of goal discrepancy is +19, suggesting an unrealistically high level of aspiration. If the same girl's occupational objective was waitress, for which the average estimate of percentage having requisite ability is 84%, the index of goal discrepancy would be -34, a level of aspiration which we consider unrealistically low. A realistic choice for a girl at this level of intelligence would be that of secretary which, according to the consensus of opinion, is attainable for 57% of the girls in the high school.

The questionnaire administered to seniors in the experimental class (N=83) also asked them to specify where they thought they stood in general ability in relation to 100 high school seniors. These estimates of own general ability by girls correlated .53 with the Honor Point Index for three years of high school (in boys it was .58) but only .39 with the 9th grade measure of general intelligence (in boys it was .78). Girls, it would appear, are much less able than boys to make estimates of their own general ability that are not strongly influenced by their assessment of their current scholastic performance. Despite the relatively low correlation between own estimate of general ability and 9th grade intelligence test score, we employ the latter measure as our best estimate of the level of general ability.

Table 2.28 shows that among girls high in intelligence, those low in anxiety in the experimental class are significantly more realistic than those

TABLE 2.27

Average Estimates by High School Girls in 1962 (N=85) of Number
of Students Out of 100 in the High School Having Sufficient
General Ability to Succeed in Various Occupations

Average Estimate of % Having Ability	Occupation as Stated on Questionnaire
11	Physician (Doctor of Medicine)
13	Scientist
13	U. S. Representative in Congress
14	Lawyer
15	College Professor
15	Author of Novels
16	Vice President of a big business
20	Musician in symphony orchestra
23	Fashion designer
24	Artist
26	Nurse
27	Medical laboratory technician
30	Interior decorator
31	School teacher
34	Social worker
35	Newspaper reporter
40	Fashion model
44	Airline hostess
46	Insurance agent
50	Librarian
50	Owner of jewelry store
52	Bookkeeper
52	Bank teller
57	Office secretary
63	Owner of beauty parlor
64	Beautician
73	Telephone operator
74	Department store salesman
84	Waitress
89	Factory worker

TABLE 2.28

Realistic and Unrealistic Vocational Aspiration Relative to Own General Ability in 12th Grade Girls of Experimental and Control Classes

Test Anxiety	Experimental					Control		
	N	Aspiration, %			N	Aspiration, %		
		Over	Realistic	Under		Over	Realistic	Under
<u>High Intelligence</u>								
Low	(22)	4	55	41	(25)	16	16	68
High	(7)	14	43	43	(16)	13	56	31
<u>Low Intelligence</u>								
Low	(13)	61	31	8	(24)	96	4	0
High	(24)	92	8	0	(34)	91	6	3

Test Anxiety	Experimental		Control		Combined	
	N	%	N	%	N	%
<u>% Showing Realistic Aspiration (High Intelligence)</u>						
Low	(22)	55	(25)	16	(47)	34
High	(7)	43	(16)	56	(23)	52

Note: Index of Goal Discrepancy derived from the difference between percentile rank of student in 9th grade intelligence and average estimate by group of percentage of students having sufficient general ability to achieve the stated vocational goal. Realistic goal discrepancy defined as within ± 10 points.

low in anxiety in the control class ($\chi^2 = 7.74$, $p < .01$). The difference between highly anxious groups who stand above the median in intelligence in the two classes is not statistically significant. This is the pattern of change we had predicted from the theory of achievement motivation. Closer inspection shows that the difference is mainly attributable to the fact that highly intelligent girls in the control class, whom we assume to be positively motivated to achieve (because anxiety is low), were predominantly under-aspirants. That is, they stated vocational objectives which senior high school girls believe to require much less general ability than they possess. Only 16% of this group (high intelligence-low anxiety) in the control class are classified realistic in aspiration. Of the comparable group in the experimental class which has had a series of acceleration experiences, 55% are classified realistic. The highly intelligent girls in the accelerated class have raised their vocational aspirations.

Among girls below the median in intelligence, there is a very strong tendency in both the experimental and control classes for occupational choice to be unrealistically high. This pattern was also observed among the less intelligent boys. But again there is some evidence of greater realism among the less anxious girls of the experimental class. Only 4% of those classified low in both intelligence and anxiety in the control class as compared with 31% in the experimental class state aspirations that are realistic relative to ability. Thus the predicted enhancement of realism of vocational aspiration as a consequence of ability grouping is apparent among girls who are low in anxiety (and presumed, therefore, to be more highly motivated to achieve). The absence of a similar change in the groups classified high in anxiety is also generally consistent with the guiding hypothesis of the study.

Table 2.29 shows the percentage of girls in various subgroups who aspire to occupations at three levels of difficulty. The pattern of results is strikingly different from that obtained for boys (Table 2.11) where the predominant tendency was to aspire to occupations judged to require ability possessed by only the top 25% of the class. Only 20% of all girls represented in the table have vocational aspirations (mainly professional aspirations) that high. Motivation is not related to preference for occupations requiring top quartile ability as it was for boys. Only intelligence is related to aiming for the ability-demanding occupations in girls. Twenty-nine percent of girls above the median intelligence as compared with 14% of those below the median aspire to occupations requiring top quartile ability ($\chi^2 = 6.22$, $p < .02$).

TABLE 2.29

Frequency of Stated Vocational Objectives of Twelfth Grade Girls
in Experimental and Control Classes Related to Their Average
Estimate of the Percentage of Students having Sufficient
General Ability to Achieve that Objective

Test Anxiety	Estimated % Having Ability							
	N	Experimental			N	Control		
		1-25%	26-50%	50%+		1-25%	26-50%	50%+
<u>High Intelligence</u>								
Low	(25)	40	60	0	(28)	21	57	21
High	(9)	33	67	0	(10)	20	60	20
<u>Low Intelligence</u>								
Low	(13)	8	62	30	(25)	16	52	32
High	(24)	8	67	25	(34)	18	50	32

Realism in Estimating Own Ability and Difficulty of Own Vocational Objectives

Table 2.30 considers the accuracy of estimates of own ability among girls in the experimental class. The result is very similar to that obtained for boys and shown in Table 2.12. Ignoring the differences in motivation, 50% of the highly intelligent girls as compared to only 3% of those low in intelligence can estimate their percentile rank in general ability (as measured by 9th grade intelligence) within ± 10 percentage points ($\chi^2 = 17.24$, $p < .001$). Thus it would appear that overestimation of own ability is a major determinant of unrealistically high aspiration in the less intelligent girls as well as boys.

Table 2.31 shows that the more intelligent girls are also more accurate in their estimates of the level of ability required for the occupation of their choice. Again ignoring the motivational differences, we find that 57% of the high intelligence group but only 14% of the low intelligence group produce estimates of the ability required for their stated aspiration within ± 10 percentage points of the consensus (average) estimate ($\chi^2 = 8.46$, $p < .01$).

TABLE 2.30

Realistic and Unrealistic Estimates of Own General Ability in 12th Grade Girls of Experimental Class
(Discrepancy between estimated percentile rank in general ability and actual percentile rank on 9th grade intelligence test)

Test Anxiety	N	Points			
		Overestimate		Accurate	Underestimate
		30+	10-29	Within ± 10	-11
<u>High Intelligence</u>					
Low	(22)	14%	32%	45%	9%
High	(8)	13	13	62	13
<u>Low Intelligence</u>					
Low	(10)	50%	40%	10%	0%
High	(21)	67	29	0	4

TABLE 2.31

Own Estimate of Level of Ability Required for Own Vocational
Choice Compared to Consensus of Opinion
(12th Grade Girls of Experimental Class)

Test Anxiety	N	Underestimate Ability Required	Agree with Consensus ($\pm$ 10 pt)	Overestimate Ability Required
<u>High Intelligence</u>				
Low	(17)	12%	59%	29%
High	(6)	33	50	17
<u>Low Intelligence</u>				
Low	(9)	11%	11%	78%
High	(12)	42	16	42

Note: The student's own estimate of % of girls having sufficient ability to achieve her stated vocational objective is compared with the average estimate by the group shown in Table 2.27.

Realism of Vocational Aspiration Relative to Estimates of Own Ability and Difficulty of Own Vocational Objective

Does the stated vocational aspiration appear realistic to the student herself? Table 2.32 presents the answer to this question for girls in the experimental class for whom all the requisite information was available. The index of goal discrepancy is now derived from the difference between a girl's own estimate of her ability and her estimate of the ability required for the occupation of her choice. Except for the group of anxious girls who are low in intelligence, the results reported in Table 2.32 are very similar to those presented for the experimental class in Table 2.28 for the experimental class. The anxious girls of low intelligence, however, appear much more realistic to themselves than they do when more objective indices are employed to evaluate the realism of the vocational aspiration.

TABLE 2.32

Subjective Realism of Vocational Aspiration of Twelfth
Grade Girls in Experimental Class

Test Anxiety	N	Over Aspiration	Realistic Aspiration*	Under Aspiration	Realistic
<u>High Intelligence</u>					
Low	(17)	6%	53%	41%	53%
High	(10)	10	30	60	30
<u>Low Intelligence</u>					
Low	(7)	43	43	14	43
High	(12)	33	42	25	42

*Realistic aspiration defined as within ± 10 points.

Note: The index of goal discrepancy is obtained from the difference between a girl's own estimate of her general ability (% rank) and her estimate of the % of students having sufficient ability to achieve her stated objective.

We conclude from examination of these several tables that for girls of low intelligence, aspirations judged by external criteria to be unrealistic over-aspirations may appear subjectively realistic because there is a strong tendency for these girls to overestimate their own ability. For girls of higher intelligence, the picture is different. While generally more realistic in aspiration than those less intelligent, the highly intelligent girls show a strong tendency to aspire to occupations which are below their measured ability and below their own estimates of their general ability. This was particularly evident in the highly intelligent girls who were low in anxiety in the control class. One of the effects of ability grouping appears to be a tendency to minimize this trend towards under-aspiration in highly intelligent and non-anxious girls.

Development of Realistic Vocational Aspiration Between Ninth and Twelfth Grades

We return to the index of goal discrepancy based on measure ability and consensus of opinion among seniors of the experimental class concerning level of ability required for various occupations to describe the realism of aspiration of girls in the experimental class in 9th as compared to 12th grade. Among the highly intelligent girls (N=25), 44% were realistically oriented in 9th grade—53% of those low in anxiety (N=19), but only 17% of those high in anxiety (N=6). (This difference, because of the smallness of the sample, is not statistically significant.) The highly intelligent anxious girls tend

to be more realistic by the time they reach senior year in high school as shown in Table 2.28. Students low in intelligence tend generally to be unrealistic. In 9th grade, only 12% (N=25) are classified realistic. By 12th grade the percentage has increased to only 16% (N=37).

Realism of Vocational Aspiration Relative to Interest Pattern

The index of congruence between stated vocational aspiration and interests, as measured by the Strong Vocational Interest Blank for women, is somewhat different than that employed for the boys. Girls had been asked to state both first and second choice of vocational objectives. The index of realism shown in Table 2.33 is based on both first and second occupational choices. In Table 2.33, the letter grades refer to the score obtained on the Strong interest blank for the subject's first and second occupational choices. A grade of A means that the interests of a girl are very similar to those of women in her chosen occupation. Lower grades imply less correspondence between interest pattern and vocational choice.

Table 2.34 compares the realism of vocational aspirations of 12th grade girls in the experimental (ability grouped) and control classes in terms of this index of realistic aspiration. There are no statistically significant differences within the experimental or control classes that are attributable to differences in anxiety. Yet there is some tendency (also observed in Table 2.28) for highly intelligent but anxious girls in the control class to be more realistic about their vocational plans than the highly intelligent but non-anxious girls.

There is no tendency for girls classified low in anxiety in the experimental class to show greater congruence between stated aspirations and interests than comparably motivated girls in the control class though they did, as shown in Table 2.28, tend to show significantly greater realism relative to their measured ability. Does this imply, particularly for the highly intelligent girls who have been exposed to ability grouping, a rise in vocational aspiration that is more commensurate with their ability than their pattern of interests? It may—particularly if the vocations aspired to by girls who have been exposed to accelerated training tend to be those traditionally filled by men.

One result that is clear in Table 2.34 is the tendency for girls low in intelligence to state vocational objectives that are more congruent with their interests than do girls of high intelligence. Combining all girls in both classes, this difference is statistically significant ($\chi^2 = 5.94$, $p < .02$). It tends to reinforce our appreciation of the complexities of the problem of vocational aspiration in young women which we have not adequately treated in this study which employed an earlier study of college men as its model.

TABLE 2.33

Criteria Adapted to Classify Stated Vocational Objectives as Realistic or Unrealistic as a Function of Degree of Congruence with Vocational Interests Assessed by the Strong Vocational Interest Blank*

Requirements for Classification					
First Choice	Second Choice	Index	First Choice	Second Choice	Index
A	A	1	B-	A	3
A	B+	1	B-	B+	3
A	B	1	B-	B	4
A	B-	2	B-	B-	4
A	C+	2	B-	C+	4
A	C	3	B-	C	5
B+	A	1	C+	A	4
B+	B+	2	C+	B+	4
B+	B	2	C+	B	5
B+	B-	2	C+	B-	5
B+	C+	3	C+	C+	5
B+	C	4	C+	C	6
B	A	2	C	A	5
B	B+	3	C	B+	5
B	B	3	C	B	5
B	B-	3	C	B-	6
B	C+	4	C	C+	6
B	C	4	C	C	6

*We are indebted to Stuart Karabenick for working out these criteria in the present data.

Note: Index scores of 3 and below are defined as realistic. Scores above 3 are defined as unrealistic.

TABLE 2.34

Realism of Vocational Aspiration of 12th Grade Girls in Experimental and Control Classes Assessed by Degree of Congruence Between Stated Vocational Objectives and Strength of Occupational Interest as Measured by Strong Vocational Interest Blank

Congruence Classification*	Experimental		Control	
	Low TAQ	High TAQ	Low TAQ	High TAQ
<u>High Intelligence</u>				
Realistic				
1	1	1	3	1
2	0 33%	0 33%	2 32%	1 60%
3	6	1	1	4
Unrealistic				
4	8	4	6	1
5	5	0	4	3
6	1	0	3	1
<u>Low Intelligence</u>				
Realistic				
1	4	5	3	7
2	1 60%	3 53%	2 56%	5 64%
3	1	1	5	4
Unrealistic				
4	3	3	5	3
5	1	3	2	3
6	0	2	1	3

*See Table 2.33 for classification scheme.

Summary

Our results show that girls high in intelligence tend to aspire to occupations which are below their abilities. For men, such a vocational aspiration may be judged "unrealistic" since he must make some vocational choice. But the situation is obviously different for girls. By the criteria we have employed to define realistic aspiration, a girl who stands at the top 20th percentile in intelligence would have to aspire to one or another occupations requiring substantial higher education or specialized talent to be considered realistic in aspiration. To define these as "realistic" choices for girls for whom non-occupational goals are likely to be conflicting or more important is highly questionable. We recognize this and view the questions raised by this analysis of more importance than the results obtained.

Nevertheless the analysis of realism of vocational aspiration relative to ability did yield one result consistent with the guiding hypothesis of the study: viz., highly intelligent girls who were low in anxiety (and assumed, therefore, to be relatively strong in positive motivation to achieve) in the experimental (ability grouped) class were more frequently judged realistic in vocational aspiration than girls of comparable intelligence and motivation in the control class. No similar difference appeared in comparisons of girls classified high in anxiety. This may mean that ability grouping and accelerated training for brighter students may encourage highly motivated girls, who might not otherwise have done so, to consider a career commensurate with her ability. The psychological problem this may pose for the highly intelligent girl is suggested in our finding that girls of lower intelligence more frequently than those of high intelligence stated vocational objectives that are congruent with their own pattern of interests.

The analysis of aspiration in girls agrees in one important respect with the analysis of aspiration in boys: students below the median in intelligence tend to have unrealistically high vocational aspirations because they tend, systematically, to overestimate their own level of ability.

The Achievement Risk Preference Scale

The Achievement Risk Preference Scale had been designed previously for use with young men but was included in the present study because of the opportunity afforded to study a female population in the experimental class. Because ARPS is a new technique, our interest in this section is mainly with evidence of its potential validity rather than hypotheses which have to do with effects of ability grouping. Evidence of the validity of this self-report inventory will be shown if (a) ARPS score is negatively related to Test Anxiety in girls; and (b) if ARPS can reproduce differences presented

in earlier tables when Test Anxiety was employed as the measure of motivation.

Table 2.35 shows that among highly intelligent girls in the experimental class, high score on ARPS is associated with low score on Test Anxiety obtained in both 9th grade ($\chi^2 = 2.37$, $p < .20$) and 12th grade ($\chi^2 = 6.31$, $p < .02$). It is not, however, related to differences in Test Anxiety among girls who are low in intelligence.

TABLE 2.35

Score on Achievement Risk Preference Scale Related to Intelligence and Test Anxiety in Girls of the Experimental Class

Test Anxiety	Intelligence	N	% Above Median on ARPS
<u>Ninth Grade</u>			
Low	High	22	64
High	High	9	33
Low	Low	10	30
High	Low	22	41
<u>Twelfth Grade</u>			
Low	High	23	70
High	High	9	22
Low	Low	12	33
High	Low	21	38

In Table 2.36, the ARPS measure is employed as if it were an adequate measure of strength of resultant motivation to achieve to determine whether or not it makes essentially the same discriminations among subgroups as Test Anxiety in reference to measures of scholastic achievement. In Section A of Table 2.36, where performance on 9th grade achievement tests is examined, the results for highly intelligent girls are generally consistent with those obtained with Test Anxiety (Table 2.24). The differences between those scoring high and low on ARPS are not significant. Among the girls classified low in intelligence, score on ARPS duplicates the result obtained with Test Anxiety concerning lowest quartile performance on the reading test ($\chi^2 = 4.17$, $p < .05$); but there is no similar confirmation of the validity of ARPS in reference to arithmetic performance.

Section B of Table 2.36 deals with Honor Point Index obtained in the sophomore year and for three years in high school. Among the highly intelligent girls, score on ARPS tends to be positively associated with high Honor Point Index in sophomore year and for three years, but the differences are not significant. Among those classified low in intelligence, ARPS is not related to any difference in academic performance.

The relationship of ARPS to each of the three measures of realistic vocational aspiration described earlier in relation to Test Anxiety (Tables 2.28, 2.32, 2.34) are all presented in Table 2.37. The data do not allow us to draw any firm conclusion concerning the validity of the ARPS as a measure of achievement-related motivation in high school girls for two reasons: (a) Test Anxiety, itself, failed to produce any statistically significant differences within the experimental class on these measures of aspiration; (b) there has been a further depletion in the number of cases because some subjects were not present on the day the ARPS was administered. With these qualifications in mind, the trends produced by ARPS look sufficiently similar to those produced by Test Anxiety to forestall the conclusion that ARPS must be considered invalid. The results are clearly inconclusive.

TABLE 2.36

Score on Achievement Risk Preference Scale Related to Performance
on 9th Grade Achievement Tests and Honor Point Index in High School
(Girls of experimental class only)

ARPS - Intelligence	Percent							
	N	H*	M	L	N	H*	M	L
	A. California Reading Test				World Book Arithmetic Test			
High-High	(17)	59	41	0	(17)	53	47	0
Low-High	(14)	36	64	0	(13)	54	46	0
High-Low	(12)	8	67	25	(12)	0	50	50
Low-Low	(21)	0	38	62	(21)	0	52	48
	B. Honor Point Index in Sophomore Year				Three-Year Honor Point Index			
High-High	(18)	56	39	5	(18)	56	44	0
Low-High	(14)	36	57	7	(14)	43	50	7
High-Low	(12)	0	50	50	(12)	8	50	42
Low-Low	(21)	5	52	43	(21)	5	52	43

*Distribution of scores divided at highest and lowest quartiles.

TABLE 2.37

Score on Achievement Risk Preference Related to Percentage of Girls
Classified as Realistic on Three Different Criteria of Realism in
Vocational Aspiration

ARPS- Intelligence	Relative to Own Measured Ability*		Subjective Index of Goal Discrepancy**		Congruence of Choice with Interests on SVIB***	
	N	%	N	%	N	%
High-High	(14)	50	(13)	69	(13)	23
Low-High	(13)	46	(9)	22	(12)	42
High-Low	(12)	0	(5)	40	(10)	40
Low-Low	(21)	19	(11)	45	(14)	71

*See Table 2.28.

**See Table 2.32.

***See Table 2.34.

CHAPTER 3

STUDY B: EFFECTS OF ABILITY-GROUPING IN SIXTH GRADE ON ACHIEVEMENT AND REPORTED INTEREST IN SCHOOLWORK

In Study B, we examine some of the motivational implications of ability-grouping in the 6th grade. Our general hypothesis, as developed in Chapter 1, is that the greater challenge produced by homogeneous grouping should produce enhancement of interest and learning among students who are more strongly motivated to achieve than to avoid failure; but if the tendency to become anxious about failure is relatively strong in relation to the strength of motive to achieve, the more competitive situation in homogeneous ability-grouped classes should provoke a greater threat than the traditional class which is heterogeneous in ability. As a consequence, the relatively more anxious students should find the homogeneous class less attractive and show some evidence of a decrement in their schoolwork.

As in Study A, we are primarily interested in the motivational effects of ability-grouping on students who differ in personality. But the present study focuses more closely than Study A did upon immediate expressions of a change in motivation during the school year in which students of the experimental group were exposed to homogeneous ability-grouping for the first time.

The hypotheses of the present study assume that in "homogeneous ability groups" the level of intelligence among students in a class is more similar than in "heterogeneous ability groups" and that greater homogeneity in intelligence has the effect of making the probability of success and failure in day-to-day schoolwork more nearly equal for most students. This, it is assumed, tends to heighten the arousal of both positive interest in achievement and anxiety about failure. The specific hypotheses tested in Study B are:

1. Students in whom the motive to achieve success (n Achievement) is relatively strong in relation to the motive to avoid failure (Test Anxiety), (a) will show more growth on measures of scholastic achievement when they are placed in a homogeneous ability group than when they are placed in a group in which the range of ability is more heterogeneous; and (b) when placed in a homogeneous group they will show more growth on measures of scholastic achievement than will students in whom the motive to avoid failure is strong in relation to motive to achieve success.

2. Students in whom the motive to avoid failure is relatively strong in relation to the motive to achieve success will show less growth on measures of scholastic achievement when they are placed in a homogeneous ability group than when they are placed in a group in which the range of ability is more heterogeneous.

3. Students in whom motive to achieve success is relatively strong in relation to the motive to avoid failure will report greater interest in class activities and a greater increase in interest compared with the previous year when they are placed in a homogeneous ability group than when they are placed in a group in which ability is more heterogeneous; and these students, when placed in a homogeneous group, will show greater interest and greater increase in interest than students in whom the motive to avoid failure is strong in relation to motive to achieve success.

4. Students in whom the motive to avoid failure is relatively strong in relation to the motive to achieve success will report less interest and less increase in interest relative to the previous year when they are placed in a homogeneous ability group than when they are placed in a group more varied in ability.

A secondary interest in the present study is to examine the adequacy of the Achievement Risk Preference Scale as a potential substitute for combined use of the thematic apperceptive measure of n Achievement and the Test Anxiety Questionnaire in studies of achievement related motivation in younger boys and girls. We investigate, for the first time, the relationship between scores obtained on this objective, self-report test of preference for intermediate degrees of risk and competitive achievement activity and TAT n Achievement and Test Anxiety in younger children. And we shall also test the stated hypotheses employing this objective test in order to compare results obtained using it and when using the thematic apperceptive measure of n Achievement in combination with the self-report scale of Test Anxiety.

Method

This study was carried out during three academic years in the 6th grade classes of three schools. Prior to 6th grade, all students had been in classes in which all levels of ability were present. During the first two years of the study, ability grouping was introduced on an experimental basis in the 6th grade classes of some schools. The basic plan of the study is to compare measures of achievement and interest in 6th grade of students experiencing homogeneous ability grouping for the first time with comparable measures obtained from students in control classes who continued (as in 5th grade) in classes that were heterogeneous in ability.

Decisions concerning criteria for grouping and assignment of students to special and regular sections in the ability-grouped schools had been made by school personnel before the study began. In each of the schools in which homogeneous ability grouping was employed, one of three 6th grade classes was composed of "selected" students; the other two classes were considered "regular" sections. In School A, intelligence test scores was the primary cri-

terion for placement in the advanced section. In School B, performance on achievement tests was given top priority. But judgment of teachers concerning individual students was an important factor in deciding who should be in "selected" and "regular" sections in both schools.

The composition of the experimental group (homogeneous in ability) and control group (heterogeneous in ability) is shown in Table 3.1.

TABLE 3.1

Composition of Experimental Group (Classes Homogeneous in Ability) and Control Group (Classes Heterogeneous in Ability) in Study 3

School	Experimental Group (Homogeneous in Ability)		
	1959	1960	1961
A	1 selected section	1 selected section	----
	2 regular sections	2 regular sections	----
B	1 selected section	----	----
	2 regular sections	----	----
	Control Group (Heterogeneous in Ability)		
	1959	1960	1961
A	----	----	4 classes
C	----	3 classes	3 classes

Note: In 1961, School A returned to heterogeneity of ability in 6th grade, but School B instituted a team-teaching method in 1960 and 1961 which made the classes unsuitable for this research either in the experimental or control groups. For this reason, a third school, C, as comparable to A and B as seemed possible in the school system was chosen to enlarge the size of the control group.

All students in each of the 6th grade classes were tested. Students for whom an intelligence test score (California Mental Maturity Test) and scores on both an Achievement and Test Anxiety were obtained numbered 206 in the homogeneous classes and 233 in the heterogeneous classes. These N's are depleted in the analysis of results, for reasons that will be later specified.

First Test Period

A thematic apperceptive test of n Achievement was administered in the classroom under neutral conditions by a female experimenter. The form of the test used consisted of four verbal leads, each of which was placed at the top of the page in the test booklet, which were to provide suggestions for the writing of stories (see Appendix B). The characters in the verbal leads were of the same sex as the subject but the content of the leads for boys and girls was otherwise the same. The use of verbal leads instead of pictures with younger children is discussed by McClelland, et al. (1953).

Following this, a preliminary form of the Test Anxiety Scale for children developed by Sarason (1960, p. 306) was read aloud. This inventory requires self-report of symptoms of anxiety experienced in test situations in the classroom.

The imaginative stories elicited by the verbal leads were scored for n Achievement by one of the writers (PO). Her scoring reliability had been established above .90 on training materials. A total n Achievement score was obtained by summing scores obtained in four stories by each subject.

The Test Anxiety score consists of the number of items out of the 40 presented on which S endorsed as self-descriptive some statement reflecting the experience of anxiety in the classroom. Sample items from the child's form are as follows:

1. When the teacher says that she is going to call on some of you to read, do you wish to yourself that she will not call on you? (yes)
2. Do you hate to do a problem on the blackboard where everybody can see if you make a mistake? (yes)
3. When the teacher says she is going to give the class a test, do you get a nervous (or funny) feeling? (yes)

The Index of Strength of Resultant Motivation to Achieve

To provide a single index of the strength of motive to achieve (n Achievement) relative to strength of motive to avoid failure (Test Anxiety), raw scores on both measures were converted to standard scores, based on the distribution of scores obtained from 6th graders in a given school in a given year. Separate distributions were obtained for boys and girls. Then the standard score on Test Anxiety was subtracted from the standard score on n Achievement, e.g. (n Achievement-Test Anxiety), to give the index of resultant motivation to achieve.

In light of the known sensitivity of these tests to temporary conditions which prevail at the time they are administered, we felt that the most meaningful index of motivation would be one which compared the standing of a student relative to a substantially large number of other students of the same sex, in the same grade, in the same school, in a given year. A high score (on Achievement-Test Anxiety) implies that the motive to achieve success is substantially stronger than the motive to avoid failure. A low score implies either very weak resultant motivation to achieve or that the motive to avoid failure (Test Anxiety) is, in fact, stronger than the motive to achieve.

Derivation of an index of motivation for each student that is relative to scores obtained by members of his class level in a particular school and year assumes that personality does not differ markedly between students in the same school in different years nor among students in the different schools studied. While there is no way of testing this assumption in the present data, it was accepted as the most reasonable way of obtaining our index of resultant achievement motivation for subsequent comparisons.

Second Test Period

Several months later in the 1959 classes and a few weeks later in the other years, a different female experimenter administered additional tests. At this time an Achievement Risk Preference Scale, consisting of 21 paired comparisons, was given (Appendix B). In each item, one alternative describes a choice or attitude which, according to the theory of achievement motivation, is characteristic of persons for whom motive to achieve is the stronger motive. The other alternative describes a choice or feeling which should be more descriptive of persons in whom motive to avoid failure is the stronger motive. The score obtained represents the number of items in which the achievement-oriented alternative is selected as self-descriptive.

Also administered was a questionnaire concerning interest in school designed for the present study. (This questionnaire had not been developed in time to administer it during the first year of the study.) It consisted of two parts: The first part is comprised of 20 specific activities which are undertaken in the 6th grade by students in our sample, e.g., writing stories and letters, studying the universe and our solar system, etc. Students were asked to place an x on a line scale at any point on a line for each item. At either end of the line and at the center, the phrases "like very much," "neither like nor dislike" and "dislike very much" were introduced as reference points. A similar format was employed for eleven other items included to elicit evidence of a change in interest in schoolwork between the 5th and 6th grades. The descriptive phrases for this second set of items were "much more interesting this year" "about the same in interest as last year" and "much less interesting this year." These questions were more general in

nature. General activities common to 5th and 6th grades like arithmetic, science, language, social studies, etc., were each rated on a single item. In obtaining interest scores, the lines were divided into five equal segments and a score of one to five was assigned for each answer. A high score represents high interest for some specific activity undertaken in 6th grade or in comparison with the previous year. Scores were summed over items yielding two final scores. One is an index of reported interest in schoolwork at the time of testing. The other represents an index of interest in some activity in 6th grade compared to interest in it in 5th grade. The interest questionnaire is presented in Appendix B.

Standardized Tests of Ability and Achievement

The California Mental Maturity Test regularly given in January in the 3rd and 6th grades as part of normal school procedure was the measure of intelligence employed in the present study. The measures of achievement were California Achievement Tests for Upper Elementary grades given in January each year. The Standardized Test of Educational Placement had also been administered in some of the classes. These test results, however, will not be considered in the analysis because for the present sample, which is markedly higher than the normative population in IQ, the test sets limits on measurable growth during the 6th grade year.

Evidence that Experimental Classes Were in Fact More Homogeneous in Ability than Control Classes

It is necessary to examine the assumption that the sections classified as homogeneous in ability were, in fact, more homogeneous in ability than the control classes which are classified heterogeneous in ability. If homogenization of ability has been accomplished, the range of differences in intelligence within a given classroom should be substantially smaller than the range of intelligence represented in the whole 6th grade. This means that for each student in an ability-grouped class, there should be less difference between his own IQ and the median IQ in his classroom than between his own IQ and the median IQ in the whole 6th grade.

We considered the IQ scores obtained by students in the 3rd and 6th grades, using the higher score as our measure of a child's intelligence when both were available. For each student, we determined whether or not his IQ score was more similar to the median of his own classroom than the median of all 6th grade students in his school. We then computed the percentage of students in each of the nine "homogeneous" classes and each of the ten "heterogeneous" classes whose intelligence was more similar to the median of his own classroom. These are shown in Table B.1 of Appendix B.

The resulting percentages were ranked and a Mann-Whitney U Test of difference between ranks of the experimental and control classes shows that the sections we have classified "homogeneous in ability" are significantly more homogeneous than those classified "heterogeneous in ability" ($U = 13.5$, $p < .02$). Combining all of the experimental and control classes we find that 66% of 206 students in sections classified "homogeneous in ability" as compared with 56% of 233 students in sections classified "heterogeneous in ability" are more similar in intelligence to the median of their classroom than the median of all 6th graders in their school ($\chi^2 = 3.97$, $p < .05$). We thus find significantly greater homogeneity of ability in those classes of the experimental group, as demanded by the hypotheses we seek to test.

Despite the efforts of school personnel to produce classes that were homogeneous in ability, some students with relatively high intelligence were assigned to regular sections and some students with relatively low intelligence were assigned to special (advanced) sections. Our analysis shows that if homogeneization in terms of intelligence, alone, had been consistently employed, students with IQ of 125 or above would have been placed in special sections and students having lower IQ in one or another of the regular 6th grade sections. To sharpen our analysis of differences between experimental and control groups, we have excluded from subsequent analysis those students of the experimental group who appear misplaced in terms of the measure of intelligence. In Table B.2 of Appendix B, the proportion of students in each class scoring at each of three levels of intelligence is shown. Twenty-one percent of students in the "homogeneous" groups (either special or regular sections) fail to satisfy the IQ requirement we imposed for inclusion in the subsequent analysis of results.

The experimental group, as purified by this analysis, consists of students having IQ of 125 or above who had been assigned to special advanced sections and students having IQ of 124 or below who had been assigned to regular sections. In the control group, students having IQ substantially above 125 and substantially below 124 are all members of the same class.

Results

The grade level scores attained on the total reading and total arithmetic tests of the California Achievement Test given in January of the 5th and 6th grades constitute the measures of scholastic achievement.

Tables 3.2 and 3.3 show the percentage of students in the homogeneous and heterogeneous 6th grade classes who score above the median on the 5th and 6th grade achievement tests.^{F7} Students in the experimental (homogeneous) and control (heterogeneous) groups are classified according to strength of resultant motivation to achieve (n Achievement-Test Anxiety) and level of intelligence.

TABLE 3.2

Percentage of Students High, Moderate and Low in Resultant Achievement Motivation who Score Above Median on California Achievement Test, Total Reading Score in Sixth and Fifth Grades.
Ss Classified in IQ, Motivation and Treatment.*

n Achievement- Test Anxiety	Homogeneous			Heterogeneous		
	% Above Median			% Above Median		
	N	6th	5th	N	6th	5th
<u>IQ 125 +</u>						
High	(25)	96	88	(39)	85	92
Moderate	(18)	78	94	(34)	56	74
Low	(11)	100	91	(29)	62	70
<u>IQ 113-124</u>						
High	(11)	45	36	(17)	53	76
Moderate	(20)	35	20	(23)	44	61
Low	(20)	15	5	(19)	11	37
<u>IQ 112 -</u>						
High	(9)	22	0	(8)	25	25
Moderate	(13)	0	8	(14)	14	21
Low	(28)	14	7	(19)	0	5
<u>All Levels</u>						
High	(45)	69	58	(64)	69	80
Moderate	(51)	41	45	(71)	45	61
Low	(59)	46	22	(67)	30	42

*Median breaks made separately for boys and girls.

TABLE 3.3

Percentage of Students High, Moderate and Low in Resultant Achievement Motivation who Score Above Median on California Achievement Test, Total Arithmetic Score in Sixth and Fifth Grades.
Ss Classified in IQ, Motivation, and Treatment.*

n Achievement- Test Anxiety	Homogeneous			Heterogeneous		
	% Above Median			% Above Median		
	N	6th	5th	N	6th	5th
<u>IQ 125 +</u>						
High	(25)	96	52	(39)	95	97
Moderate	(18)	83	78	(34)	74	88
Low	(11)	91	45	(29)	62	86
<u>IQ 113-124</u>						
High	(11)	45	36	(17)	29	53
Moderate	(20)	35	20	(23)	26	39
Low	(20)	25	20	(19)	32	26
<u>IQ 112 -</u>						
High	(9)	44	33	(8)	13	38
Moderate	(13)	8	8	(14)	0	29
Low	(28)	18	21	(19)	11	4
<u>All Levels</u>						
High	(45)	73	44	(64)	67	75
Moderate	(51)	45	37	(71)	42	61
Low	(59)	32	25	(67)	44	45

*Median breaks made separately for boys and girls.

Looking first at the result for all levels of intelligence combined, given at the bottom of the tables, we fail to find any marked difference between the homogeneous and heterogeneous groups on 6th grade achievement tests. The percentage of Ss at comparable levels of motivation who score above the median on 6th grade tests is so similar for the two treatments that inspection alone permits the inference of no difference. The only substantial trend on 6th grade achievement tests is the consistent tendency for Ss high in resultant motivation to achieve to perform better than those low in resultant motivation to achieve.

Can we conclude from this that the grouping procedure had no effect on scholastic performance? The answer to this question is provided by examination of achievement test scores attained in the 5th grade. At each level of motivation, students who were later assigned to the homogeneous ability groups in 6th grade scored lower on the 5th grade achievement tests of reading and arithmetic than students who continued in heterogeneous classes in 6th grade. In other words, the control group in the present study scored higher on these achievement tests than the experimental group before the grouping procedure had been introduced.

This unanticipated result may be explained in part by the fact that a larger percentage of the control group score 125 or above on intelligence. Fifty percent of the heterogeneous group as compared with 37% of the homogeneous group score that high in intelligence. But this is not a sufficient explanation, for when the scholastic achievements in 5th grade of the three levels of intelligence are considered separately, it is apparent that students in the heterogeneous group generally have an initial advantage.

Considering the proportion of Ss who score above the median in both years, the growth in the homogeneous ability group appears to be greater than in the heterogeneous group. There is a general tendency for a larger proportion of the homogeneous group to score above the median in the 6th than in the 5th grade. Just the opposite is true for Ss in the heterogeneous group.

The marked discrepancy between the initial positions of the experimental and control groups introduced a difficulty in assessing the effects of method of grouping on growth. The most obvious solution to the problem was to determine, for each subject, the number of months gained in grade level between the two testings. Thus a growth of 6.6 to 7.6 would be considered equivalent to a growth of 7.6 to 8.6. This method could be justified only if raw changes in growth were not associated with 5th grade score. To make a rough check on this requirement, the proportion of students whose 5th grade scores were above and below the median for their sex and who showed above median growth for their sex was determined. This comparison showed that 69% of students with low 5th grade reading scores showed above median growth, while only 22% of students with high 5th grade scores showed above median growth. The relationship between 5th grade arithmetic score and amount of growth was much less pronounced.

The cause of the high relationship between initial position and amount of growth on the reading test was apparent. This test was simply too easy for students in the present sample. The California Achievement Test, constructed for use in the 4th, 5th, and 6th grades was standardized on a population with a mean IQ of 100. In the present sample, the intelligence is markedly higher. In the 5th grade, the median total reading score falls at about the 90th percentile and median total arithmetic score falls at about the 80th percentile on national norms. The test itself imposes limitations on the amount of growth that can be measured, especially for students with high 5th grade scores.

To provide an adequate measure of growth between 5th and 6th grade that would control for initial position, the following steps were taken. An estimate of the mean increase in grade level was determined for students having 5th grade achievement test scores at different grade levels. Since students classified moderate in resultant motivation to achieve were not explicitly included in any of the hypotheses to be tested, they were employed to provide an estimate of average growth as related to initial 5th grade position. The mean growth attained by moderately motivated students classified homogeneous and heterogeneous was weighted equally.¹⁸ Table 3.4 presents estimates of mean change in school-years of 10 months obtained on the reading and arithmetic tests as a function of initial standing in 5th grade by the moderately motivated students.

Table 3.4 shows that the higher a student scored on the 5th grade achievement test, the smaller was his growth between 5th and 6th grades as measured in school-year units (10 months). The estimates of mean amount of growth associated with initial standing in 5th grade obtained from students moderate in motivation provide a basis for a simple classification of the relative amount of growth shown by all other students. The amount of growth shown by a student on reading or arithmetic was classified high (meaning above average) if his gain between 5th and 6th grade exceeded the mean gain shown in Table 3.4 for persons having the same 5th grade level as his own.

Slight reversals in the size of mean gains between adjacent levels on arithmetic shown in Table 3.4 were assumed due to chance. The raw change score defining the lower limit for the classification high growth is clearly specified in Table 3.4.

In the subsequent analysis of performance, students classified moderate in motivation are no longer considered since they were employed to provide the criterion of what constitutes relatively high growth as a function of initial 5th grade standing. Furthermore, the analysis is restricted to Ss for whom scores on both achievement tests were available in both 5th and 6th grades, and Ss whose 5th grade scores fell within the range of scores shown in Table 3.4 for which there were a sufficient number of Ss moderate in achievement motivation to define what constitutes relatively high or low growth.

TABLE 3.4

Growth in California Achievement Test Scores in Relation to Grade Level Score in Fifth Grade for Students Scoring in the Middle Third in Resultant Motivation to Achieve, All Classes

5th Grade Score	N	Mean Change	Raw Score Considered High Growth
<u>Reading</u>			
3.0-3.9	(1)	---	---
4.0-4.9*	(7)	---	---
5.0-5.9	(17)	1.45	1.6
6.0-6.9	(26)	1.45	1.6
7.0-7.9	(39)	1.01	1.1
8.0-8.9	(38)	.59	.7
9.0-9.9	(11)	.00	.1
<u>Arithmetic</u>			
4.0-4.9	(8)	1.57	1.6
5.0-5.9	(28)	1.36	1.5
6.0-6.9	(61)	1.45	1.5
7.0-7.9	(32)	1.23	1.3
8.0-8.9	(11)	1.25	1.3
9.0-9.9	(0)	---	---

*All Ss are from heterogeneous group.

The growth shown by each student between 5th and 6th grades on the reading and arithmetic tests was classified high (above average for his 5th grade level) or low (below average for his 5th grade level). Separate analyses of results for the arithmetic and reading tests are presented in Appendix Tables B.3 and B.4. The trends are similar. To provide a single overall estimate of growth, each student was classified as having shown high growth on both, one, or neither of the two achievement tests (Table B-5, Appendix B).

Table 3.5 presents the final results of this analysis. Students are classified according to intelligence, motivation, and homogeneous versus heterogeneous grouping in the 6th grade. Since the more intelligent students showed greater growth generally than the less intelligent students, the criteria employed in comparisons among highly intelligent students who differ in motivation is more stringent than for the two lower levels of intelligence in Table 3.5. The results for boys and girls considered separately are closely similar (Table B.6, Appendix B) and thus combining results for boys and girls in analysis justified.

TABLE 3.5

Percentage of Students Showing Above Median Growth in Reading
and Arithmetic on California Achievement Test

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% High	N	% High
<u>IQ 125 and Above</u>				
		<u>Both Areas</u>		<u>Both Areas</u>
High	(24)	71	(37)	46
Low	(10)	50	(27)	37
<u>IQ 113-124</u>				
		<u>Both or One Area</u>		<u>Both or One Area</u>
High	(11)	90	(17)	41
Low	(17)	65	(19)	58
<u>IQ 112 and Below</u>				
High	(8)	88	(8)	38
Low	(23)	52	(14)	36
<u>High Motivation: Homogeneous vs. Heterogeneous</u>				
				χ^2
		High IQ		3.65
		Moderate IQ		6.93
		Low IQ		4.00
				<u>14.58</u>
				p < .01
<u>Low Motivation: Homogeneous vs. Heterogeneous</u>				
		High IQ		.51
		Moderate IQ		.18
		Low IQ		.95
				<u>1.64</u>
				n.s.
<u>Homogeneous Group: High Motivation vs. Low Motivation</u>				
		High IQ		1.34
		Moderate IQ		2.45
		Low IQ		3.12
				<u>6.91</u>
				p < .10
<u>Heterogeneous Group: High Motivation vs. Low Motivation</u>				
		High IQ		.51
		Moderate IQ		1.00*
		Low IQ		.00

*Lows exceed highs.

The combined effect of comparisons made separately and evaluated by chi square test at each level of intelligence confirms the following hypotheses:

1. Students who are high in resultant motivation to achieve (n Achievement-Test Anxiety) show greater growth when assigned to a class that is homogeneous in ability than when assigned to a class that is heterogeneous in ability ($\chi^2 = 14.48$, 3 df, $p < .01$).
2. Students who are high in resultant motivation to achieve show greater growth in a homogeneous ability group than students who are low in resultant motivation to achieve ($\chi^2 = 6.91$, 3 df, $p < .10$).

There is, however, no support for the hypothesis that homogeneous grouping would be disadvantageous for students low in resultant motivation to achieve. There is, in fact, a tendency for the performance of students low in resultant motivation to achieve to be better under homogeneous than heterogeneous conditions at all levels of intelligence. But the combined effect of these differences is not statistically significant ($\chi^2 = 1.64$, 3 df, n.s.)

Finally, there is no evidence that the difference in resultant motivation to achieve had an effect on growth between 5th and 6th grade in the heterogeneous classes. The observed differences are small, inconsistent and not statistically significant. No formal hypothesis was stated concerning effect of a difference of motivation on growth in the heterogeneous group because the method of grouping did not differ for them. Hence there was no reason to suppose that motivation would have a differential effect on performance in the 5th and 6th grades. This does not mean that achievement-related motivation had no effect on their scholastic achievement. Tables 3.2 and 3.3 have already shown the generally expected effect of the difference in motivation on level of performance in both the 5th and 6th grades. Table 3.5, in contrast, shows evidence of differential growth only within the classes that are homogeneous in ability.

Reported Interest in Schoolwork

Scores on the two sections of the interest questionnaire (liking for specific 6th grade activities and liking of more general activities in 6th as compared to 5th grade) were divided at the median for boys and girls separately since girls generally tended to score higher than the boys. Most children in the sample reported generally high interest in present school activities and tend moreover to report that the 6th grade is more interesting than the previous year.

The interest questionnaire was devised during the second year of the study and thus data are available for only one of the three 6th grades exposed to homogeneous treatment. The results for boys and girls are combined although medians were separately calculated for each sex on the interest measures.

Considering the results for all students in the homogeneous and heterogeneous groups without regard to differences in motivation, there is no evidence that either treatment produces greater overall interest in present activities or greater change of interest between 5th and 6th grades. Forty-nine percent of Ss in the heterogeneous group and 44% in the homogeneous group score high (above the median) in present interest ($\chi^2 = .66$) and 50% of each group score high (above the median) on interest in 6th grade compared with interest in 5th grade. When interest of Ss who differ in achievement motivation is considered, however, it is evident that homogeneous grouping does produce substantial differences in degree of interest that are related to the motivational dispositions of students.

Table 3.6 shows the predicted higher interest of Ss high in achievement motivation as compared with those low in motivation within the homogeneous group ($\chi^2 = 7.78$, $p < .005$). Individual differences in achievement-related motivation do not, however, influence interest in the heterogeneous groups. There is a slight tendency for Ss high in motivation to report higher interest in the homogeneous group, but this difference is not significant ($\chi^2 = .31$, n.s.). On the other hand, the hypothesis that Ss low in motivation would respond to the more competitive situation as less attractive is confirmed in the comparison between comparable groups in the homogeneous and heterogeneous classes ($\chi^2 = 7.28$, $p < .005$).

TABLE 3.6

Percentage of Students High, Moderate and Low in Resultant
Achievement Motivation Reporting Above Median
Interest in Sixth Grade Activities

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N*	% Above Median	N	% Above Median
High	18	61	78	53
Moderate	22	55	82	44
Low	22	18	73	51
			χ^2	p(one-tail)
Homogeneous: High vs. Low Motivation			7.78	< .005
Heterogeneous: High vs. Low Motivation			.15	---
High Motivation: Homogeneous vs. Heterogeneous			.31	---
Low Motivation: Heterogeneous vs. Homogeneous			7.28	< .005

*The interest questionnaire was introduced in the second year of the study and therefore obtained from only one of the homogeneous ability-grouped classes.

In Table 3.7, parallel comparisons are made for the self-report of interest in general activities of 6th grade relative to interest in similar activities in 5th grade. Again we find that interest is positively related to resultant motivation to achieve in the homogeneous classes ($\chi^2 = 6.86$, $p < .005$) but not in the heterogeneous classes. The trends shown by the high and low motivation groups between the two treatments are consistent with our hypotheses. Students who are strong in resultant motivation to achieve report significantly greater interest in 6th as compared to 5th grades when they are in homogeneous ability-grouped classes [$\chi^2 = 2.79$, $p < .05$ (one-tail test)]. Students low in resultant motivation to achieve report near significantly less interest in 6th as compared to 5th grade when they are in homogeneous ability-grouped classes [$\chi^2 = 1.67$, $p < .10$ (one-tail test)]. The justification for combining the results for boys in girls is provided by the high degree of similarity of findings for the two sexes (Table B.7, Appendix B).

TABLE 3.7

Percentage of Students High, Moderate and Low in Resultant Achievement Motivation Reporting Above Median Interest in Sixth as Compared With Fifth Grade

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
High	18	78	78	56
Moderate	22	41	82	43
Low	22	36	73	52
			χ^2	$p(\text{one-tail})$
Homogeneous: High vs. Low Motivation			6.86	< .005
Heterogeneous: High vs. Low Motivation			.29	---
High Motivation: Homogeneous vs. Heterogeneous			2.79	< .05
Low Motivation: Heterogeneous vs. Homogeneous			1.67	< .10

Although the number of cases are small in the homogeneous groups, it is important to determine whether or not the predicted findings are obtained both for highly intelligent students in selected sections and for students with lower ability in the regular sections of the ability-grouped class. The theory of achievement motivation implies that motivation will be associated with interest in the same manner for students in the selected and the regular sections since in all sections the level of ability is more homogeneous than in the

control group. However, it might be argued that the selected and regular sections differ in status. Since high motivation tends to be associated with high intelligence, the obtained results concerning interest could be generated by bright children, who tend to be highly motivated, finding greater satisfaction in the high status class and other children tending to be lower in motivation finding less satisfaction in a class with low status. To examine this possibility the results for students in selected and regular sections are considered separately in Tables 3.8 and 3.9. It is clear that the effect of homogeneous ability grouping on the interest of students who are high and low in resultant motivation to achieve is present among both highly intelligent students placed in special advanced sections and less intelligent students in regular sections.

TABLE 3.8

Percentage of Students High, Moderate and Low in Resultant Achievement Motivation Reporting Above Median Interest in Sixth Grade Activities. Students of High, Moderate and Low Intelligence Reported Separately

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
<u>High IQ</u>				
High	(6)	67	(45)	58
Moderate	(11)	73	(39)	46
Low	(5)	20	(31)	58
<u>Moderate and Low IQ</u>				
High	(12)	58	(33)	49
Moderate	(11)	36	(43)	42
Low	(17)	18	(42)	45

TABLE 3.9

Percentage of Students High, Moderate and Low in Resultant Achievement Motivation Reporting Above Median Interest in Sixth as Compared With Fifth Grade. Students of High, Moderate and Low Intelligence Reported Separately

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
<u>High IQ</u>				
High	(6)	67	(45)	60
Moderate	(11)	27	(39)	44
Low	(5)	40	(31)	61
<u>Moderate and Low IQ</u>				
High	(12)	83	(33)	51
Moderate	(11)	55	(43)	42
Low	(17)	35	(42)	45

The Achievement Risk Preference Scale

We are interested in determining whether or not the ARPS may be considered a valid measure of resultant achievement motivation in children. Its validity will be demonstrated if high score on the ARPS is associated with high score on the index of resultant achievement motivation derived from separate measures of n Achievement and Test Anxiety and if scores on the ARPS reproduces the results for performance and interest that have been obtained with the measures of established validity. In Table 3.10, the percentage of boys and girls scoring high, moderate and low in resultant achievement motivation who score high (above the median) on the ARPS is reported.^{F9} This analysis shows a significant positive relationship between achievement motivation and ARPS score for the girls, but not for the boys. The lack of comparability between the sexes requires that in further analysis employing the ARPS, the two sexes are separately considered. In Table 3.11 the relationships between ARPS and the measures of interest in 6th grade are examined. One trend emerges clearly. For both sexes, on both interest measures and in both treatments, a high score on ARPS is associated with greater reported interest in 6th grade work. One might infer from this that both the ARPS and the interest questionnaire reflect a generally positive interest in achievement-related activities or, what is more probable, individual differences in the tendency to give what are considered socially desirable answers. In any event, the objective test of risk-preferences in achievement activity has failed to produce the differences predicted by theory and substantiated when assessment devices of established validity are employed.

TABLE 3.10

Percentage of Students High, Moderate and Low in Resultant
Achievement Motivation Scoring Above Median on
Achievement Risk Preference Scale

n Achievement- Test Anxiety	Boys		Girls	
	N	% High	N	% High
High	(63)	46	(64)	70
Moderate	(64)	39	(68)	49
Low	(65)	43	(69)	49
High vs. Low Motivation $\chi^2 = .10$ n.s.			High vs. Low Motivation $\chi^2 = 6.15$, $p < .02$	

TABLE 3.11

Percentage of Students High and Low on the Achievement Risk
Preference Scale Who Report Above Median Interest in
Sixth Grade Activities and Above Median Interest in
Sixth as Compared With Fifth Grade Activities*

ARPS	Boys				Girls			
	Homogeneous		Heterogeneous		Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median	N	% Above Median	N	% Above Median

A. Interest in Sixth Grade Activities

High	(13)	62	(52)	62	(14)	65	(66)	58
Low	(20)	30	(57)	33	(15)	40	(58)	43

B. Interest in Sixth Grade as Compared
With Fifth Grade Activities

High	(13)	54	(52)	58	(14)	63	(66)	61
Low	(20)	45	(57)	42	(15)	27	(58)	41

*Median breaks made separately for boys and girls.

In the earlier analysis of growth as measured by achievement test performance, three levels of intelligence were considered separately. High growth was defined as above average growth on both reading and arithmetic for the highly intelligent group and as above average growth on at least one test for the remainder of subjects. Since the number of cases is reduced roughly in half at each level of intelligence when we make separate analyses for boys and girls, we have combined the three levels of intelligence in Table 3.12 although employing the same criteria to define high growth as in the earlier analysis (Table 3.5).

TABLE 3.12

Percentage of Students Showing High Growth on Combined
California Achievement Test Scores
(Reading and Arithmetic)*

ARPS	Boys				Girls			
	Homogeneous		Heterogeneous		Homogeneous		Heterogeneous	
	N	% High	N	% High	N	% High	N	% High
High	(25)	48	(41)	49	(39)	67	(51)	33
Low	(46)	76	(48)	40	(27)	59	(51)	47

*Growth scores are defined as high or low in terms of IQ scores, i.e., for students above 125 in IQ, above median growth in both areas is defined as high; for students below 125 in IQ, above median growth in one or both areas is defined as high.

The results for boys and girls shown in Table 3.12 are completely lacking in consistency. The trends obtained using the ARPS (as if it were a measure of resultant motivation to achieve) are similar to those using TAT n Achievement and Test Anxiety for girls. Those scoring high on ARPS show significantly greater growth in the homogeneous classes ($\chi^2 = 9.84$, $p < .01$) than in heterogeneous classes. And the slight (though insignificant) tendency for girls scoring low on ARPS to show more growth in the homogeneous condition is also consistent with the result when TAT n Achievement-Test Anxiety is employed. But the results obtained for boys are directly opposite to what was expected and found using the already validated measures of motivation. Boys scoring low on ARPS show significantly greater growth in the homogeneous group than the heterogeneous group ($\chi^2 = 12.85$, $p < .01$), and significantly greater growth than those scoring high on ARPS in the homogeneous classes ($\chi^2 = 5.81$, $p < .02$).

Why there should be some slight evidence of the potential validity of ARPS as a measure of resultant achievement motivation in young girls, but re-

sults completely opposite to our expectations for boys we are frank to admit not knowing. We conclude that considerable more developmental work will be needed before the inferences to be made from this paired-comparison test of achievement-related preferences are fully understood.

Discussion

The results of Study B indicate that placement in homogeneous ability groups does not lead to a general enhancement or decline in interest or learning. Rather, motivational dispositions interact with treatment so that the effect for some students is advantageous and for others disadvantageous. Students high in resultant achievement motivation show higher growth in achievement and greater interest in schoolwork when in homogeneous groups than when in heterogeneous groups. Students low in resultant achievement motivation (the more anxious students), show a decline in interest when placed in homogeneous ability groups but no marked difference in achievement. Within homogeneous classes, achievement motivation is positively related to better growth and higher interest. Within heterogeneous classes there is no relationship between motivation and interest or growth in performance between 5th and 6th grades. Differences associated with motivation are obtained both for students of high ability placed in special advanced sections and for students of lower levels of ability placed in regular sections. If these results are confirmed in subsequent investigations, achievement motivation should become a pertinent factor in determining which children should be assigned to homogeneous ability groups if maximization of interest in schoolwork and learning is desired.

CHAPTER 4

SUMMARY AND CONCLUSIONS

The basic hypothesis investigated was that ability grouping would have differential effects on the motivation and performance of students depending upon the relative strengths of their need to achieve and disposition to be anxious about failure. An ability grouped class was conceived theoretically as one which would create for all or most students a situation in which probability of success and failure relative to one's peers in day-to-day schoolwork are more nearly equal than when all degrees of ability are represented in the same classroom. As a consequence, students more strongly motivated to achieve than anxious about failure were expected to show enhanced interest in schoolwork, enhanced performance, and greater evidence of involvement in realistic vocational planning when subjected to ability grouping. In contrast, it was expected that those more strongly disposed to be anxious in a competitive achievement situation and less positively motivated to achieve would show less interest and satisfaction in schoolwork, perhaps a decrement in performance, and less realistic involvement in vocational planning than their more highly motivated peers when subjected to ability grouping. It was assumed, in other words that ability grouping would produce greater arousal of achievement-related motivation than the traditional class that is heterogeneous in ability. Thus the effects of individual differences in achievement-related motivation were expected to be more pronounced under ability grouping.

The general hypotheses are strongly supported by the results of Study B which examined effects on scholastic achievement and interest in schoolwork among 6th graders exposed to ability grouping for the first time—with one exception. Students classified weak in Achievement but strong in Test Anxiety showed no evidence of a decrement in performance under ability grouping relative to a control condition though they did appear less interested and less satisfied with their schoolwork than comparably motivated students in classes that were heterogeneous in ability.

The results of Study B, the better controlled of the two studies, sustain the general hypothesis that ability grouping has differential motivating effects depending upon the personality of the student. This should encourage more thorough and systematic analyses of the motivational implications of ability grouping.

The results of Study A, which examined the effects of ability grouping beginning in junior high school and carried out systematically in high school, provide very little evidence which clearly supports the general hypothesis. Among boys, there was no evidence that those stronger in resultant motivation to achieve (Achievement-Test Anxiety) showed more enhanced performance under ability grouping than those considered more anxious. Among girls there was some suggestive evidence that less anxious girls profitted more by ability grouping, but there was no consistent trend. The analysis of performance suffered from the fact that so few students in the experimental class took the National Merit Examination which would have provided a more adequate criterion of achievement in various fields than grades attained. It was an anticipated misfortune.

Results concerning vocational aspiration of high school boys tend to be generally consistent with earlier findings that realistic aspiration is more characteristic of persons strongly motivated to achieve than anxious about failure. And the trend of the results is consistent with the hypothesis that achievement orientation is heightened by ability grouping. Particularly striking is the fact that vocational aspirations were significantly more often congruent with the pattern of vocational interests among highly motivated boys in the ability-grouped class than the control class.

Among girls realistic vocational aspiration relative to own ability was more frequent among those low in Test Anxiety in the ability-grouped class and more frequent than in the control class. This, again, is a trend consistent with the guiding hypothesis and evidence that ability grouping may encourage some highly intelligent and motivated girls who would otherwise under-aspire to set their sights on a vocational objective that is commensurate with their ability.

Perhaps the most significant result of the analysis of vocational aspiration in relation to motivation and intelligence is the abundant evidence that the unrealistically high vocational aspirations of many boys can be attributed to the tendency of those who are relatively low in intelligence to overestimate their own ability. It would appear that current educational practices may tend to under emphasize the importance of helping students to develop a firm and realistic picture of their own ability in relation to that of others and to the demands of various occupations.

The lack of systematic order in the results of Study A may be attributed to a questionable assumption in terms of which the study was designed. It had been assumed that achievement-related motivational dispositions would be relatively stable during the three year period between 9th and 12th grades. Our results show substantial stability in Test Anxiety scores during this period, but only minimal evidence of stability in n Achievement of boys and none whatever in girls. It now is evident that we had confounded the problem of effects of ability grouping and another problem of interest in its own right in Study A: the changes in achievement-related dispositions of personality during the adolescent years. For this reason, we consider Study B a more adequate test of hypotheses concerning the immediate effects of ability grouping on the motivation of students who differ in personality. The value of Study A lies in the questions it raises and the preliminary information it provides concerning the development of realistic vocational aspiration in high school students.

The attempt to validate an objective test of achievement-related motivation called the Achievement Risk Preference Scale was only partially successful. Relationships between scores on this test and measures of n Achievement and Test Anxiety, while not consistent in different age groups, nevertheless encourage the belief that such a test can be developed. Results obtained with high school boys showed the closest correspondence to results obtained using the thematic apperceptive measure of n Achievement and Test Anxiety Questionnaire. But we discovered that scores on this test are also positively related to intelligence in high school boys and that the pattern of results using it with other groups of students does not completely reproduce results obtained with the measures of established validity. Hence we must conclude that considerably more developmental work is needed before such an objective test can be recommended as a valid device for assessment of individual differences in achievement-related motivation.

APPENDIX A.

TEST MATERIALS ADMINISTERED IN STUDY A AND SUPPLEMENTARY TABLES

TABLE A.1

Equivalence of Experimental and Control Groups of Students in
Terms of Ninth Grade Intelligence Scores

n Achievement- Test Anxiety	Intelligence	Experimental (Accele- ration for Boys of High Intelligence)			Control (No Syste- matic Acceleration Program)		
		Ninth Grade (Intelligence)					
		N	Mean	Range	N	Mean	Range
<u>A. Boys</u>							
High	High	22	125.3	115-138	25	122.6	116-140
Low	High	11	125.3	116-148	15	121.6	115-136
High	Low	8	105.3	88-114	16	107.6	98-114
Low	Low	28	97.6	74-108	26	100.0	82-114
<u>B. Girls</u>							
Low*	High	26	123.0	113-144	28	122.5	112-144
High	High	9	121.0	112-133	16	118.0	112-124
Low	Low	13	105.5	97-111	25	101.8	80-111
Low	High	14	96.2	74-111	35	99.9	82-111

*Test Anxiety only.

TABLE A.2

Comparison of Students Classified High in Intelligence in the
Experimental Class (1962) Who did and did not Take the
National Merit Examination. (The Distribution of
Intelligence and Honor Point Scores of this
Group is Divided at the Median for Each Sex)

% Above Common Median				
	Intelligence		3 yr Honor Point Index	
	N	%	N	%
<u>A. Boys</u>				
Took Exam.	19	47	19	58
Did not	14	57	14	36
		$\chi^2 = .31$		$\chi^2 = 1.59$
		n.s.		$p < .30$
<u>B. Girls</u>				
Took Exam.	22	55	22	64
Did not	13	39	13	31
		$\chi^2 = 2.82$		$\chi^2 = 3.79$
		$p < .10$		$p < .10$
113				

TABLE A.3

Description of First Choices Among Stated Vocational Aspirations
of Boys in the Experimental (Ability-Grouped) and
Control Classes of Study A

n Achievement- Test Anxiety	High Ability (115+)		Low Ability (114-)	
	High (N=47)	Low (N=26)	High (N=21)	Low (N=50)
Medicine	6%	31%	14%	2%
Law, Government, and Public Administration	6	8	14	8
Teaching	9	4	5	16
Science	24	31	14	6
Engineering	17	8	14	6
Business	19	11	10	32
Other Professions	6	0	19	4
Journalism	4	4	0	0
Skilled and Unskilled Labor	0	0	5	20
Other	9	4	5	6

Realism of Vocational Aspiration With Respect to Interest

The Strong Vocational Interest Blank was used to determine realism of vocational aspiration with respect to interest. When stated vocational objectives were congruent with interest scores on the Strong, the choice was considered realistic; when they were not, the choice was considered unrealistic. The congruence of vocational objectives and interests was evaluated by a method adapted from Mahone (1960), who used three classes of data to define realism: (1) Ss' letter grade on the occupational key that corresponded to his stated vocational objective, (2) clinical judgments as to the "appropriate" major area of interest, (3) clinical judgments made as to the "appropriate" minor area of interest. In the present study objective criteria of realism were established in lieu of clinical judgments.

Vocational objectives were defined as the first and second choices stated by Ss. Three scores were assigned:

1. The letter grade on the occupational key which was the first choice of S.
2. The letter grades in the area of interest which was the first choice of S (major area of interest).
3. The letter grades in the area of interest which was the second choice of S (minor interest area).

The interest areas of the SVIB were redefined as suggested by Darley and Hagenah (1955). Interest areas consisting of one occupation were combined with the most appropriate interest area, i.e., III was combined with IV, VII with X and XI with IX. Area VI consisting of the single occupation of musician was eliminated since it was not highly correlated with any other area. Thus the original 11 interest areas were reduced to seven. These seven are: I Biological Sciences, II Physical Sciences, IV Technical, V Social Sciences, VIII Business Detail, IX Business Contact and X Verbal Linguistic. The occupations for which there are keys on the SVIB are listed below with the appropriate interest area.

Occupational choices made by Ss frequently did not have a corresponding key on the SVIB. In such cases choices were assigned to the most similar key. When specific assignment could not be made, assignment was made only to an interest area. Inclusion in a key or area was based upon the relationship of the occupation chosen and the criterion group used in constructing the SVIB scale. These assignments are reported in Table A.5.

The criteria for classification of realism of choices on a six point scale are reported in Table A.6.

TABLE A.4

Occupations with Scored Keys on the SVIB for Men and
Assignment to Interest Areas (Men)

Interest Area—Occupation	Interest Area—Occupation
I.	V.
1. Artist	3. Public Administrator
2. Psychologist	4. YMCA Secretary
3. Architect	5. Soc. Sci. H.S. Teach.
4. Physician	6. City School Supt.
5. Osteopath	7. Social Worker
6. Dentist	8. Minister
7. Veterinarian	VI. Musician (no interest area)
II.	VII. C.P.A. (assigned to Area X)
1. Mathematician	VIII.
2. Physicist	1. Senior C.P.A.
3. Engineer	2. Accountant
4. Chemist	3. Office Man
III. Production Manager (Assigned to Area IV)	4. Purchasing Agent
IV.	5. Banker
1. Farmer	6. Mortician
2. Aviator	7. Pharmacist
3. Carpenter	IX.
4. Printer	1. Sales Manager
5. Math., Physics, Sci., Teach.	2. Real Estate Salesman
6. Indust. Arts. Teach.	3. Life Ins. Salesman
7. Vocat. Agr. Teach.	4. Pres. Manuf. Concern
8. Policeman	X.
9. Forest Service Man	1. Advertising Man
10. Production Manager	2. Lawyer
V.	3. Author-Journalist
1. YMCA Physical Director	4. C.P.A.
2. Personnel Director	XI. Pres. Manufacturing Concern (assigned to Area IX)

TABLE A.5

Stated Vocational Objective and Assigned Area and
Occupation on SVIB (Men)

Stated Vocational Objective	Assigned SVIB Occupation Key	SVIB Interest Area and Occupation
Bookkeeper	Accountant	VIII-2
Lawyer	Lawyer	X-2
Druggist	Pharmacist	VIII-7
Machinist		IV
Jewelry Store Owner	Sales Manager	IX-1
Bank Teller	Office Man	VIII-3
Insurance Agent	Life Ins. Salesman	IX-3
Mail Carrier		IV
Dept. Store Salesman		IX
Bus Driver		IV
State Gov.		X
Night Watchman		IV
Electrician		IV
Garage Mechanic		IV
College Prof.		II
Automobile Repairman		IV
Newspaper Reporter	Author-Journalist	X-3
Physician (Doctor)	Physician	I-4
Vice Pres. of Big. Bus.	Pres. Manuf. Concern	IX-4
School Teacher		IV
Scientist		II
U.S. Rep. in Cong.	Lawyer	X-2
Minister (or Priest)	Minister	V-8
Musician in Symphony	Musician	Key used but no area assigned
Author of Novels	Author-Journalist	X-3
Engineer	Engineer	II-3
Accountant	C.P.A.	X-4

TABLE A.6

Criteria for Realism of Vocational Aspiration With Respect
to Interest on the SVIB (Men)

Score	Criteria for Score
1.	A or B plus on key (if any); primary pattern in major interest area; secondary pattern in minor interest area (if any).
2.	A or B plus on key (if any); primary pattern in major interest area; unrelated pattern in minor interest area.
3.	Any one of the three following minimum requirements: (a) B on key; primary pattern in major area; unrelated pattern in minor area. (b) B plus on key; unrelated pattern in major area, secondary pattern in minor area. (c) A on key; unrelated pattern in both major and minor areas.
4.	Any one of the three following minimum requirements: (a) B plus on key; unrelated pattern in major area, no minor area. (b) B on key; secondary pattern in major area, no minor area. (c) No key; secondary pattern in major area, no minor area.
5.	Either one of the following minimum requirements: (a) B on key; unrelated pattern in both major and minor areas. (b) B minus on key; secondary pattern in either major or minor areas.
6.	All other patterns of scores.

Interest in areas is determined by letter grades in occupations in that area. When the majority of scores on the occupations in an area are A or B $\frac{1}{2}$, that area is considered to be of primary interest. When the majority of scores are B and B $\frac{1}{2}$, that area is considered to be of secondary interest. All other patterns of scores are for our purposes scored unrelated.

For the girls, a modified method of defining realism in terms of interest was employed. Since on the SVIB for women there are too few occupations in any area to be considered a valid measure of interest in that area only the degree of congruence between the first two occupational choices and the letter grades on the corresponding key on the SVIB was employed to define realism. When the occupational choices did not have a corresponding keyed occupation, assignment to one of the keys was made when this was deemed justified. These judgments are reported in Table A.7. For the women, as for the men, realism was scored on a six point scale. Specific criteria utilized are reported in Table A.8.

For both men and women, realistic choices were defined as those scored one, two or three. Scores of four, five and six are defined as unrealistic.

TABLE A.7

Stated Vocational Objective and Assigned
Occupation on SVIB (Women)

Occupational Choice	Assigned SVIB Occupation Key
U.S. Rep. in Cong.	Lawyer
College Prof.	Math-Science Teacher
School Teacher	Elementary Teacher
Anthropologist	Math-Science Teacher
Office Sec'y.	Stenog.-Sec.
Bookkeeper	Office Worker
Scientist	Math-Science Teacher
Medical Lab. Tech.	Lab. Tech.
Physical Therapist	Occupational Therapist
Dentist Hygienist	Lab. Tech.
Bank Teller	Office Worker
Fashion Designer	Artist
Med. Sec'y.	Stenog.-Sec'y.
Interior Decorator	Artist
Diplomat	Lawyer
Medical Illustrator	Artist
Store Manager	Buyer

TABLE A.8

Criteria for Realism of Vocational Aspiration With
Respect to the SVIB (Women)

Letter Grade for Occupation Chosen		Realism Index	Letter Grade for Occupation Chosen		Realism Index
1st Choice	2nd Choice		1st Choice	2nd Choice	
A	A	1	B-	A	3
A	B+	1	B-	B+	3
A	B	1	B-	B	4
A	B-	2	B-	B-	4
A	C+	2	B-	C+	4
A	C	3	B-	C	5
B+	A	1	C+	A	4
B+	B+	2	C+	B+	4
B+	B	2	C+	B	5
B+	B-	2	C+	B-	5
B+	C+	3	C+	C+	5
B+	C	4	C+	C	6
B	A	2	C	A	5
B	B+	3	C	B+	5
B	B	3	C	B	5
B	B-	3	C	B-	6
B	C+	4	C	C+	6
B	C	4	C	C	6

Ratings of Difficulties of Occupations (Boys' Form)

It is generally felt that various occupations require a certain amount of intelligence or general ability. What percentage of the students at Ann Arbor High School you feel have sufficient general ability (i.e. verbal and quantitative ability) to attain the following occupational goals, provided they were motivated to do so?

FOR EACH OCCUPATION, PLACE A CHECK IN THE APPROPRIATE PERCENTAGE COLUMN.

- (1) Only the top 1%
- (5) Upper 5%
- (10) Upper 10%
- (20) Upper 20%
- (30) Upper 30%
- (40) Upper 40%
- (50) Upper 50%
- (75) Upper 75%
- (100) Practically any one.

Occupation	<u>1</u>	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>75</u>	<u>100</u>
Bookkeeper	_____	_____	_____	_____	_____	_____	_____	_____	_____
Lawyer	_____	_____	_____	_____	_____	_____	_____	_____	_____
Druggist	_____	_____	_____	_____	_____	_____	_____	_____	_____
Machinist	_____	_____	_____	_____	_____	_____	_____	_____	_____
Jewelry Store Owner	_____	_____	_____	_____	_____	_____	_____	_____	_____
Bank Teller	_____	_____	_____	_____	_____	_____	_____	_____	_____
Insurance Agent	_____	_____	_____	_____	_____	_____	_____	_____	_____
Mail Carrier	_____	_____	_____	_____	_____	_____	_____	_____	_____
Department Store Salesman	_____	_____	_____	_____	_____	_____	_____	_____	_____
Bus Driver	_____	_____	_____	_____	_____	_____	_____	_____	_____
State Governor	_____	_____	_____	_____	_____	_____	_____	_____	_____
Night Watchman	_____	_____	_____	_____	_____	_____	_____	_____	_____
Electrician	_____	_____	_____	_____	_____	_____	_____	_____	_____
Garage Mechanic	_____	_____	_____	_____	_____	_____	_____	_____	_____
College Professor	_____	_____	_____	_____	_____	_____	_____	_____	_____

<u>Occupation</u>	<u>1</u>	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>75</u>	<u>100</u>
Automobile Repairman	—	—	—	—	—	—	—	—	—
Newspaper Reporter	—	—	—	—	—	—	—	—	—
Physician (Doctor of Medicine)	—	—	—	—	—	—	—	—	—
Vice President of a big business	—	—	—	—	—	—	—	—	—
School Teacher	—	—	—	—	—	—	—	—	—
Scientist	—	—	—	—	—	—	—	—	—
U.S. Representative in Congress	—	—	—	—	—	—	—	—	—
Minister (or Priest)	—	—	—	—	—	—	—	—	—
Musician in a symphony orchestra	—	—	—	—	—	—	—	—	—
Author of novels	—	—	—	—	—	—	—	—	—

In the space below, write in the occupation you plan to follow after you finish your education.

Now place a check in the appropriate percentage column for the occupation you have written in.

Ratings of Difficulties of Occupations (Girls' Form)

It is generally felt that various occupations require a certain amount of intelligence or general ability. What percentage of the students at Ann Arbor High School you feel have sufficient general ability (i.e. verbal and quantitative ability) to attain the following occupational goals, provided they were motivated to do so?

FOR EACH OCCUPATION, PLACE A CHECK IN THE
APPROPRIATE PERCENTAGE COLUMN.

- (1) Only the top 1%
- (5) Upper 5%
- (10) Upper 10%
- (20) Upper 20%
- (30) Upper 30%
- (40) Upper 40%
- (50) Upper 50%
- (75) Upper 75%
- (100) Practically any one.

Occupation	<u>1</u>	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>75</u>	<u>100</u>
Bookkeeper	—	—	—	—	—	—	—	—	—
Lawyer	—	—	—	—	—	—	—	—	—
Owner of Beauty Parlor	—	—	—	—	—	—	—	—	—
Bank Teller	—	—	—	—	—	—	—	—	—
Insurance Agent	—	—	—	—	—	—	—	—	—
Dept. Store Salesman	—	—	—	—	—	—	—	—	—
College Pro- fessor	—	—	—	—	—	—	—	—	—
Newspaper Reporter	—	—	—	—	—	—	—	—	—
Physician (Medical Doctor)	—	—	—	—	—	—	—	—	—
Vice President of a big business	—	—	—	—	—	—	—	—	—
School Teacher	—	—	—	—	—	—	—	—	—
Scientist	—	—	—	—	—	—	—	—	—
Musician in symphony orchestra	—	—	—	—	—	—	—	—	—
Author of Novels	—	—	—	—	—	—	—	—	—

Occupation	<u>1</u>	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>75</u>	<u>100</u>
U.S. Representative in Congress	_____	_____	_____	_____	_____	_____	_____	_____	_____
Librarian	_____	_____	_____	_____	_____	_____	_____	_____	_____
Social Worker	_____	_____	_____	_____	_____	_____	_____	_____	_____
Factory Worker	_____	_____	_____	_____	_____	_____	_____	_____	_____
Office Secretary	_____	_____	_____	_____	_____	_____	_____	_____	_____
Medical Lab Technician	_____	_____	_____	_____	_____	_____	_____	_____	_____
Nurse	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fashion Model	_____	_____	_____	_____	_____	_____	_____	_____	_____
Telephone Operator	_____	_____	_____	_____	_____	_____	_____	_____	_____
Airline Stewardess	_____	_____	_____	_____	_____	_____	_____	_____	_____
Waitress	_____	_____	_____	_____	_____	_____	_____	_____	_____
Interior Decorator	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fashion Designer	_____	_____	_____	_____	_____	_____	_____	_____	_____
Owner of Jewelry Store	_____	_____	_____	_____	_____	_____	_____	_____	_____
Beautician	_____	_____	_____	_____	_____	_____	_____	_____	_____
Artist	_____	_____	_____	_____	_____	_____	_____	_____	_____

In the space below, write in the occupation you plan to follow after you finish your education.

Now place a check in the appropriate percentage column for the occupation you have written in.

Ratings of Anticipated Satisfaction in Occupations (Boys' Form)

Your Attitudes Concerning Occupations

If things worked out so that you were in the following occupations as an adult, would you be satisfied or dissatisfied? Put a check next to each occupation to show how you would feel about it.

<u>Occupation</u>	<u>Very</u> <u>Dissatisfied</u>	<u>Rather</u> <u>Dissatisfied</u>	<u>Rather</u> <u>Satisfied</u>	<u>Very</u> <u>Satisfied</u>
Bookkeeper				
Lawyer				
Druggist				
Machinist				
Jewelry Store Owner				
Bank Teller				
Insurance Agent				
Mail Carrier				
Department Store Salesman				
Bus Driver				
State Governor				
Night Watchman				
Electrician				
Garage Mechanic				
College Professor				
Automobile Repairman				
Newspaper Reporter				
Physician (Doctor of Medicine)				
Vice President of a big business				
School Teacher				
Scientist				
U.S. Representative in Congress				
Minister (or Priest)				

<u>Occupation</u>	<u>Very Dissatisfied</u>	<u>Rather Dissatisfied</u>	<u>Rather Satisfied</u>	<u>Very Satisfied</u>
Musician in a symphony orchestra				
Author of novels				
Other (Would you care to list any other occupations to check for satisfaction or dissatisfaction?)				

Which of the occupations listed above come closest to what you are now thinking of trying for when you are finished with your education?

Put a circle around the name of the occupation that comes closest to the one you have in mind. (For example, Druggist.)

Put an "X" to the left of the name of the occupation that is next closest to the one you have in mind. (For example, X-Electrician)

Put a line under the name of the occupation that is third closest to the one you have in mind. (For example, Night Watchman.)

THANK YOU.

Ratings of Anticipated Satisfaction in Occupations (Girls' Form)

Your Attitudes Concerning Occupations

If things worked out so that you were in the following occupations as an adult, would you be satisfied or dissatisfied? Put a check next to each occupation to show how you would feel about it.

<u>Occupation</u>	<u>Very Dissatisfied</u>	<u>Rather Dissatisfied</u>	<u>Rather Satisfied</u>	<u>Very Satisfied</u>
Bookkeeper				
Lawyer				
Owner of Beauty Parlor				
Bank Teller				
Insurance Agent				
Dept. Store Salesman				
College Professor				
Newspaper Reporter				
Physician (Medical Doctor)				
Vice President of a big business				
School Teacher				
Scientist				
Musician in symphony orchestra				
Author of Novels				
U.S. Representative in Congress				
Librarian				
Social Worker				
Factory Worker				
Office Secretary				
Medical Lab Technician				
Nurse				
Fashion Model				
Telephone Operator				

<u>Occupation</u>	<u>Very Dissatisfied</u>	<u>Rather Dissatisfied</u>	<u>Rather Satisfied</u>	<u>Very Satisfied</u>
Airline Stewardess				
Waitress				
Interior Decorator				
Fashion Designer				
Owner of Jewelry Store				
Beautician				
Artist				
Other (Would you care to list any other occupations to check for satisfaction or dissatisfaction?)				

Which of the occupations listed above come closest to what you are now thinking of trying for when you are finished with your education?

Put a circle around the name of the occupation that comes closest to the one you have in mind. (For example, Librarian)

Put an "X" to the left of the name of the occupation that is next closest to the one you have in mind. (For example, X-Nurse.)

Put a line under the name of the occupation that is third closest to the one you have in mind. (For example, Artist.)

THANK YOU.

Rating of Own Ability Relative to Fellow Students

Some people feel that grades are a good measure of intelligence or general ability, but this may not be the case for some people who are working, carrying extra heavy extra-curricular programs or are often ill. Irrespective of your own grades, where do you think you stand in relation to your fellow students in general ability (i.e. verbal and quantitative ability)? (a) Upper 1 %, (b) Upper 5 %, (c) Upper 10 %, (d) Upper 20 %, (e) Upper 30 %, (f) Upper 40 %, (g) Upper 50%, (h) Upper 75 %, (i) Lowest 25 %.

Achievement Risk Preference Scale (High School Form)

On the following questionnaire you are asked to select which of two statements is the more true of you. Please be sure to answer all questions. For some questions both statements may be descriptive of you. In these cases, please select the one which is more true of you. For other questions, neither may be descriptive of you. In these cases, please indicate which of the two is more descriptive of you.

Answers should be given on the answer sheet provided.

1. I like games and sports in which I compete against:
 - A. chance.
 - B. other people.
2. I rather:
 - A. like giving reports before the class.
 - B. dislike giving reports before the class.
3. If I were a relief pitcher, I would like to be called into the game when:
 - A. my team was trailing 6 to 2.
 - B. the score was tied.
4. Before class exams I am:
 - A. often nervous.
 - B. rarely nervous.
5. I would:
 - A. like to be a stockbroker.
 - B. not like to be a stockbroker.
6. When I am playing a game or participating in a sport I am:
 - A. more concerned with having fun than with winning.
 - B. very intent on winning.
7. When a task stumps me I:
 - A. return to work on it.
 - B. tend to give it up.
8. When I am reading a magazine and come across puzzles or quizzes I:
 - A. often stop to try them.
 - B. rarely stop to try them.
9. I think:
 - A. factory workers should be paid more than they are presently.
 - B. business executives should be paid more than they are presently.
10. When I am sure I can do a task:
 - A. I enjoy doing it most.
 - B. I become bored.
11. When I play a game:
 - A. I hate to lose.
 - B. I love to win.
12. I feel:
 - A. unhappy when I do something less well than I had expected.
 - B. happy when I do something better than I had expected.
13. I would like to compete with:
 - A. eight other players in a game of skill in which the winner was awarded \$90.
 - B. another player in a game of skill in which the winner was awarded \$20.
14. If I were a pinch hitter, I'd like to come to bat when:
 - A. my team was leading 6 to 3.
 - B. the score was tied.

15. I would rather:
A. like being interviewed for a job.
B. dislike being interviewed for a job.
16. If my team were:
A. leading 7 to 3 when I was called in to pitch and my team lost, I would be unhappy.
B. trailing 7 to 3 when I was called in to pitch and my team won, I would be happy.
17. If I were a pitcher I'd like to be called out of the game when:
A. my team was leading 8 to 3.
B. the score was tied.
18. After summer vacation, I am:
A. glad to get back to school.
B. not glad to get back to school.
19. I would:
A. like to be the best player among three competitors.
B. dislike to be the poorest player among three competitors.
20. I recite in class:
A. less than other students.
B. more than other students.
21. I enjoy sports more when I compete against:
A. one other player.
B. several other individual players.
22. When layoffs are necessary I think:
A. ability should determine who should be kept on.
B. length of service should determine who should be kept on.
23. If I were recovering from a serious illness I would like to:
A. spend my time developing a new skill.
B. take advantage of the time to completely relax.
24. I:
A. dislike having other people criticize my work.
B. like having other people praise my work.
25. I would prefer a job in which:
A. I was rarely called upon to speak before groups.
B. I was frequently called upon to speak before groups.
26. When I have a lot of trouble working on a problem I continue working for a long time if when I began:
A. I expected to be able to solve it.
B. I knew I had a small chance of solving it.
27. I:
A. like playing charades.
B. dislike playing charades.

28. I think:

- A. college professors should be paid more than they are presently.
- B. public school teachers should be paid more than they are presently.

29. I:

- A. enjoy or would enjoy doing adult jig-saw puzzles.
- B. do not or would not enjoy doing adult jig-saw puzzles.

30. I:

- A. would like to run for public office.
- B. would not like to run for public office.

31. I like working on a problem when I have:

- A. a fifty-fifty chance of solving it.
- B. a very small chance of solving it.

32. When I am engaged in a sport or game I enjoy it:

- A. more if a money bet is made.
- B. less if a money bet is made.

33. If I applied for a job I wanted very much, I would be:

- A. unhappy if I was not hired.
- B. happy if I was hired.

34. Before class examinations I often have a sense of:

- A. eager anticipation.
- B. uneasiness.

35. I like playing a game when I am:

- A. equal in skill to my opponent.
- B. far superior in skill to my opponent.

36. If I were to apply to college, my first choice would be one at which:

- A. I was almost certain of being accepted.
- B. my chances of being accepted or rejected were about equal.

37. I would prefer classes in which:

- A. the students were all of about equal ability.
- B. I was superior in ability to almost all the other students.

38. If I were a teacher I would like to teach in a school in which:

- A. student evaluations of teaching were made every year.
- B. student evaluations of teaching were not made.

39. If I were a defense attorney I would prefer cases in which:

- A. the financial and prestige awards would be great if I won an acquittal, but I felt there was little chance of winning.
- B. the financial and prestige rewards would be moderate if I won an acquittal, and I felt acquittal and conviction were equally likely.

40. If I were consistently beaten by a friend in a game of skill, I would be most likely to:

- A. continue to play the same game with him.
- B. suggest a new game in which we were evenly matched.

(Items 41-52 administered only to girls)

41. If I were to entertain my husband's boss for dinner I would prepare:
- A. a good but simple meal that had never failed.
 - B. a meal that was usually exceptionally good but had occasionally failed.
42. When I prepare dinner, clean my room or dress for an important occasion:
- A. I feel happy when my parents praise me.
 - B. I feel unhappy when my parents are critical.
43. When I date a boy:
- A. it is important to me that he be successful in his studies, in sports and/or in some other activities.
 - B. it is relatively unimportant to me that he be successful in his studies, in sports and/or in some other activities.
44. After I am married and my children are older, I will probably:
- A. combine married with a career.
 - B. not want to work.
45. When I play tennis or golf or engage in some other competitive sport with a boy I really like:
- A. I am happier if he wins.
 - B. I am happier if I win.
46. When I marry, I would prefer to:
- A. work for several years while my husband prepared for a professional or business career.
 - B. to have my husband established in a vocation that did not require extensive training or my working.
47. If I failed in preparing two desserts, one that my friends said was very easy and one that they said was very difficult, I would try the one they said was:
- A. difficult more times before giving it up.
 - B. easy more times before giving it up.
48. When I have children I will try to teach them to:
- A. try new and difficult things and do well in competition with other children.
 - B. rely on me for advice and come to me for help in making important decisions.
49. When I do things to help at home, I prefer to
- A. do routine tasks I know I can do.
 - B. do things that require care and skill and that I do poorly occasionally.

50. When I marry:

- A. it is of crucial importance to me that my husband be highly competent in his work.
- B. it is not of crucial importance to me that my husband be highly competent in his work.

51. When I marry, I would prefer that my husband:

- A. be indifferent to how well I cooked and kept house.
- B. care about and comment on how I cooked and kept house.

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APPENDIX B

TEST MATERIALS ADMINISTERED IN STUDY B AND SUPPLEMENTARY TABLES

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TABLE B.1

Percentage of Students for Whom IQ is More Similar to Own Class
Median IQ than to Median IQ for the Total Sixth
Grade Group for a Given School in a Given Year

Homogeneous Classes	Heterogeneous Classes
81	62
69	61
68	60
67	58
67	57
61	56
60	54
58	53
55	52
	48

Mann-Whitney U = 13.5

p < .02

TABLE B.2

Percentage of Students in Each Class Scoring
at Each of Three Levels of IQ

Class	N	125+, %	124-113, %	112-, %
Homogeneous				
Special	29	69	28	3
Special	21	62	33	5
Special	26	85	11	4
Regular	25	12	48	40
Regular	19	11	36	53
Regular	19	32	26	42
Regular	15	13	40	47
Regular	29	17	52	31
Regular	23	20	54	26
	<u>206</u>			
Heterogeneous				
	20	20	55	25
	24	56	24	20
	21	43	38	19
	28	57	25	18
	29	28	24	48
	29	45	17	38
	19	63	37	0
	23	57	26	17
	19	63	21	16
	21	71	24	5
	<u>233</u>			

Note: Students contained in the boxes (above) appear to be misplaced in terms of the intelligence requirement imposed in the analysis of results. They are excluded from the subsequent analysis.

TABLE B.3

Percentage of Students Showing Above Median Growth in
Arithmetic on California Achievement Test

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
<u>IQ 125+</u>				
High	(24)	83	(37)	60
Low	(10)	70	(27)	48
<u>IQ 113-124</u>				
High	(11)	64	(17)	35
Low	(20)	45	(19)	47
<u>IQ 112-</u>				
High	(9)	67	(8)	13
Low	(28)	39	(21)	19

TABLE B.4

Percentage of Students Showing Above Median Growth
in Reading on California Achievement Test

n Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
<u>IQ 125+</u>				
High	25	80	39	69
Low	11	73	27	67
<u>IQ 113-124</u>				
High	11	73	17	29
Low	17	53	19	21
<u>IQ 112-</u>				
High	8	63	8	25
Low	23	39	14	14

TABLE B.5

Percentage of Students Showing Above Median Growth on
Both, One, or Neither Reading and Arithmetic
of California Achievement Test

n Achievement- Test Anxiety	Homogeneous				Heterogeneous			
	N	% Above Median			N	% Above Median		
		Both	One	Neither		Both	One	Neither
<u>IQ 125+</u>								
High	(24)	71	25	4	(37)	46	38	16
Low	(10)	50	40	10	(27)	37	41	22
<u>IQ 113-124</u>								
High	(11)	45	45	10	(17)	23	18	59
Low	(17)	30	35	35	(19)	11	47	42
<u>IQ 112-</u>								
High	(8)	50	38	12	(8)	0	38	62
Low	(23)	30	22	48	(14)	0	36	64

TABLE B.6

Percentage of Boys and Girls Showing Above Median Growth in
Reading and Arithmetic on California Achievement Test

n Achievement- Test Anxiety		Homogeneous, %	Heterogeneous, %
<u>Boys</u>			
<u>IQ 125+</u>			
		<u>High Both Areas</u>	<u>High Both Areas</u>
High	13	77	18
Low	6	67	9
<u>IQ 113-124</u>			
		<u>High Both or One Area</u>	<u>High Both or One Area</u>
High	5	100	8
Low	12	40	11
<u>IQ 112-</u>			
High	4	100	4
Low	8	50	6
<u>Girls</u>			
<u>IQ 125+</u>			
		<u>High Both Areas</u>	<u>High Both Areas</u>
High	11	64	19
Low	4	25	18
<u>IQ 113-124</u>			
		<u>High Both or One Area</u>	<u>High Both or One Area</u>
High	6	83	9
Low	5	60	8
<u>IQ 112-</u>			
High	4	75	4
Low	15	53	8

TABLE B.7

Percentage of Boys and Girls High, Moderate and Low in
 n Achievement-Test Anxiety Reporting Above Median
 Interest in Sixth Grade Activities and Above
 Median Interest in Sixth as Compared With
 Fifth Grade Activities

Achievement- Test Anxiety	Homogeneous		Heterogeneous	
	N	% Above Median	N	% Above Median
A. <u>Interest in Sixth Grade Activities</u>				
		<u>Boys</u>		
High	10	60	38	53
Moderate	11	55	38	40
Low	12	17	33	49
		<u>Girls</u>		
High	8	63	40	55
Moderate	11	55	44	48
Low	10	20	40	53
B. <u>Interest in Sixth as Compared With Fifth Grade Activities</u>				
		<u>Boys</u>		
High	10	70	38	55
Moderate	11	36	38	37
Low	12	42	33	58
		<u>Girls</u>		
High	8	89	40	58
Moderate	11	45	44	48
Low	10	30	40	63

Measure of Achievement for Sixth Grade Children
(Instructions and Verbal Cues Employed to Elicit Stories)

Making up Stories

We will all spend the next few minutes making up stories and writing them on the pages which follow.

Each page has a suggestion to start off the story. Then there is space for you to make up the rest of the story.

To help you, there are other suggestions printed on the page for each story with space for you to fill in.

The first suggestion is "Tell what is happening."

The Second suggestion is "Tell what happened before."

The third suggestion is "Tell what is being thought about and what is wanted by the people in your story."

The last suggestion is "Tell what will happen."

When we begin, we will all read the suggestion for a story together. Then if you will make up a story by filling in the spaces, we will all finish together. We will spend about two minutes answering each of the questions. That will mean a total of eight minutes for each story.

Let's turn to the first page and read the suggestion together.

Verbal Cues: (Words in Parentheses Substituted for Girl Subjects)

1. This story is about a brother and sister playing a game. One of them is a little ahead of the other.
2. This story is about a boy (girl) sitting at his (her) desk in a school room.
3. This is a story about a father and his son (mother and her daughter) talking about something important.
4. This is a story about a boy (girl) working on something in his (her) room. A friend is watching.

Measure of Test Anxiety for Sixth Grade Children*

Instructions to Class for Test Anxiety Questionnaire

(Administered by Non-School Personnel With Teacher Absent)

"We are not giving you a test. When the teacher gives you a test there are right and wrong answers. We are going to ask you some questions about how you feel and what you think but there are no right or wrong answers. When we ask you a question, think about it and then put a circle either around yes or no. Maybe you will put a circle around yes and your neighbor will put a circle around no. That is because you feel differently. It does not make any difference what anybody else does. You think about each question and then put a circle around a yes or no. Remember there are no right or wrong answers. We want to know what you think and feel. Try to be as honest as possible.

No one but me will ever see your answer sheet."

*This is an early form of the test developed by Seymour Sarason, Yale University. We are indebted to him for making it available to us for this study. His discussion of the more refined test which has evolved in recent years is presented in Sarason (1960).

Test Anxiety Questionnaire (Children's Form)
Seymour Sarason, Yale University

1. When the teacher says that she is going to call on some of you to read, do you wish to yourself that she will not call on you?
2. Do you worry when the teacher says she is going to find out how much you have learned?—or how much you know?
3. Do you worry about being promoted?
4. When the teacher says that she is going to call on some of you to do arithmetic problems, do you wish to yourself that she will not call on you?
5. When the teacher asks you to get up in front of the class and read, are you afraid that you are going to make some bad mistakes?
6. Do you hate to do a problem on the blackboard where everybody can see if you make a mistake?
7. Do you sometimes dream at night that you are in school and do not know how to answer the teacher's questions?
8. When you are at home and you are studying your reading lessons for the next day, do you worry that when you wake up the next day you will not remember your reading lessons?
9. Do you sometimes think that you worry more than other children about school?
10. When the teacher is teaching you about arithmetic, do you feel that other children in the class are not as worried about understanding her as you are?
11. When you are in bed at night do you sometimes worry about how you are going to do in class the next day?
12. When the teacher is teaching you about reading, do you feel that other children in the class are not as worried about understanding her as you are?
13. When you are at home and you are studying your arithmetic lessons for the next day, do you become afraid that when the teacher calls upon you the next day you will not know the right answers?

14. If you miss school because you are sick do you worry that you will not be able to do as well as the other children when you return to school?
15. Do you sometimes dream at night that other boys and girls in your class can do things you cannot do?
16. When you are at home and you are studying your lessons, do you become afraid that when the teacher calls upon you the next day you will not know the right answers?
17. When you are doing your lessons do you find that you bite your pencil?
18. If you did very poorly when the teacher called on you would you probably feel like crying even though you would try not to?
19. When you know you are going to take a test in school, do you feel at breakfast as if you cannot eat?
20. When the teacher says she is going to find out how much you have learned, does your heart begin to beat faster? (hand on heart—illustrate)
21. When the teacher asks you a question do you sometimes mispronounce words even though you know the answer?
22. When the teacher calls on you to read do you sometimes feel that you will not be able to open your mouth to read?
23. When the teacher wants to find out how much you have learned, do you get a funny feeling in your stomach? (hand on stomach—illustrate)
24. When the teacher asks you to write on the blackboard in front of the class do you sometimes feel that the hand you write with shakes a little?
25. Are you afraid of school tests?
26. Do you worry a lot before you take a test?
27. Do you worry a lot while you are taking a test?
28. After you have taken a test do you worry because you think you did not do well?
29. Have you sometimes dreamed at night that you failed a test you had in school that day?
30. When the teacher says she is going to give the class a test, do you become afraid that you are going to fail—that you will do poorly?

31. Do you find that when you are taking a hard test you cannot remember something that you know very well—you have forgotten something you knew before you took the test?
32. Do you find that a lot of times you wish you didn't worry so much about tests?
33. When the teacher says she is going to give the class a test, do you get a nervous (or funny) feeling?
34. While you are taking a test do you usually think you are not doing well?
35. When you are taking a test do you sometimes notice that the hand you write with shakes a little?
36. When you are taking a hard test do you bite your nails?
37. While taking a test do you perspire or sweat a lot?
38. While you are taking a test do you feel you have to go to the toilet?
39. Do you sometimes dream at night that the teacher is angry because you do not know your lessons?
40. When you are on your way to school do you sometimes worry about the teacher giving the class a test?

Questionnaire Employed to Assess Interest in
Schoolwork Among Sixth Grades

In the following questionnaire I would like you to tell me how much you like or liked certain things about school this year. For each question there is a line or scale. At the ends of each line there are descriptions of opposite feelings or opinions. In the middle of each line there is a phrase that describes a feeling in between the descriptions of opposite feelings at the ends of the line. You may think of the line as a ruler that measures how you feel about an activity. You are to put an X on that point on the line that shows best how you feel about an activity. This X may be placed at any point on the line. It may, in other words, be placed at either end of the line, at the middle of the line, or at any place in between the descriptions. In each case, place the X at the point which shows how you feel.

These questions refer to how much you like or liked some of the things you have been doing in school this year.

Let us take a sample question that might be asked of high school students.

1. Doing experiments chemistry

_____		_____
Like very much	Neither like nor dislike	Dislike very much

If a student liked doing experiments in chemistry very much, he would place his X at the left end of the line. If he disliked this activity very much he would place his X at the right end of the line. If he neither liked nor disliked it, he would place an X toward the middle of the line. If he liked doing experiments quite well, his X would be placed in between the left end of the line and the middle of the line.

1. Writing stories and letters

Like very much

Neither like nor dislike

Dislike very much

2. Studying how climate influences the way people live in other parts of the world

Like very much

Neither like nor dislike

Dislike very much

3. Studying the universe and our solar system

Like very much

Neither like nor dislike

Dislike very much

4. Punctuating sentences

Like very much

Neither like nor dislike

Dislike very much

5. Making relief maps

Like very much

Neither like nor dislike

Dislike very much

6. Studying the way people live in the arid regions or dry lands

Like very much

Neither like nor dislike

Dislike very much

7. Multiplying and dividing with fractions

Like very much

Neither like nor dislike

Dislike very much

8. Working on panel discussions and debates

Like very much

Neither like nor dislike

Dislike very much

9. Painting with water colors

Like very much

Neither like nor dislike

Dislike very much

10. Studying weather forecasting

Like very much

Neither like nor dislike

Dislike very much

11. Answering questions in the Weekly Reader or Junior Scholastic

Like very much

Neither like nor dislike

Dislike very much

PLEASE TURN THE PAGE NOW

12. Studying the causes of tornadoes and hurricanes

Like very much Neither like nor dislike Dislike very much

13. Writing poems

Like very much Neither like nor dislike Dislike very much

14. Doing problems on the blackboard

Like very much Neither like nor dislike Dislike very much

15. Studying about the soil

Like very much Neither like nor dislike Dislike very much

16. Doing book reports

Like very much Neither like nor dislike Dislike very much

17. Reciting in class

Like very much Neither like nor dislike Dislike very much

18. Doing story problems in arithmetic

Like very much Neither like nor dislike Dislike very much

19. Reading Stories

Like very much Neither like nor dislike Dislike very much

20. Working in the spelling workbook

Like very much Neither like nor dislike Dislike very much

In the next set of questions I would like you to think of how much you like your work in school this year, in comparison with how much you liked your work in school last year. In these questions, place an X on the point on the line which shows how you feel. Remember in these questions you are to consider how you feel about your work this year in comparison to how you felt about your work last year.

PLEASE TURN THE PAGE NOW

21. In comparison with our work in the fifth grade our work this year in arithmetic is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

22. In comparison with our work in the fifth grade our work this year in science is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

23. In comparison with our work in the fifth grade our work this year in language is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

24. In comparison with our work in the fifth grade our work this year in reading is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

25. In comparison with our work in the fifth grade our work this year in spelling is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

26. In comparison with our work in the fifth grade our work this year in social studies is

|
much more interesting
this year

|
about the same in interest
as last year

|
much less interesting
this year

27. In general I like school this year

|
much more than
last year

|
about the same as
last year

|
much less than
last year

28. In comparison with last year I feel I am learning

|
much more this year
than last year

|
about the same this year
as last year

|
much less this year
than last year

PLEASE TURN THE PAGE NOW

29. In comparison with last year, I like to talk with my parents about what I am studying in school

much more this year
than last year

about the same this year
as last year

much less this year
than last year

30. In comparison with last year, I like the other students in my class

much more this year
than last year

about the same this year
as last year

much less this year
than last year

31. In comparison with last year, I am trying to do my best in school

much more this year
than last year

about the same this year
as last year

much less this year
than last year

Achievement Risk Preference Scale (Grade School Form)

What I Like

On the next few pages there are some questions that we would like you to answer about yourself. For each question there are two statements or sentences. You should read both sentences and then decide which one is more true about you. Then put a circle around the letter that goes with the statement that is more true about you.

Let's take an example. Suppose this were one of the questions:

- A. I like to go to the movies.
- B. I do not like to go to the movies.

If you like to go to the movies you should put a circle around the "A". If you do not like to go to the movies, you should put a circle around the "B". It was probably easy to decide which one to choose on this question. Most of us like to go to the movies and so most of us would put a circle around the "A".

Sometimes it will be harder to choose. For example, if both statements are true about you, it may be hard to decide which is more true.

Suppose this were one of the questions:

- A. I like to swim.
- B. I like to go to the movies.

Now you are supposed to choose the statement that is more true about you. This may be hard to decide. You may like to swim and you may also like to go to the movies. But you can choose only one. If you like to swim better than you like to go to the movies, you should put a circle around the "A". If you like to go to the movies more than you like to swim, you should put a circle around the "B".

Sometimes you may have to choose between two sentences when neither one is really true about you.

Suppose this were one of the questions:

- A. I like to walk to school when it rains.
- B. I like to walk to school when it is very cold.

Remember you are supposed to choose the statement that is more true of you. But it may be that you do not like to walk to school when it rains and also that you do not like to walk to school when it is very cold. But you must choose one of the two statements. You should choose the one you like better. If you would rather walk to school when it rains than when it is very cold, you should put a circle around the "A". If you would rather walk to school when it is very cold than when it rains, you should put a circle around the "B".

You should answer all the questions. For each question, put a circle around "A" if "A" is more true for you. Put a circle around "B" if "B" is more true for you. If you have any questions about what you should do, please ask me now. I want to be sure that all of you understand what you should do.

There are no right or wrong answers. This isn't a test. We are giving it to you to find out what you like. And you can tell us this better than anyone else.

For each pair of statements put a circle around the letter (A or B) which is more true of you. Answer all questions.

1. A. I like games and sports when who wins depends on how well you can play.
B. I like games and sports when who wins depends mostly on how much luck you have.
2. A. I rather dislike speaking in front of the class.
B. I rather like speaking in front of the class.
3. A. If I were a relief pitcher, I'd like to be called into the game when my team was losing 6 to 2.
B. If I were a relief pitcher, I'd like to be called into the game when the score was tied.
4. A. I rather like to take tests in school.
B. I rather dislike to take tests in school.
5. A. I like working on a problem when I have a small chance of solving it.
B. I like working on a problem when I have a fifty-fifty chance of solving it.
6. A. When I play a game I care more about having fun than winning.
B. When I play a game I care very much about winning.
7. A. I go back and work on a problem I haven't been able to do.
B. When I can't do a problem, I usually give it up.
8. A. When I am reading a magazine and see puzzles or quizzes, I often stop to try them.
B. When I am reading a magazine and see puzzles or quizzes, I don't often stop to try them.
9. A. I think factory workers should be paid more than they are.
B. I think business executives should be paid more than they are.
10. A. I get bored with problems when I am sure I can do them.
B. I enjoy problems most when I am sure I can do them.
11. A. I don't like picture puzzles.
B. I like picture puzzles.
12. A. I would like to play a game with eight other people in a game of skill in which the winner won \$9.
B. I would like to play a game with another person in which the winner won \$2.
13. A. I like to show my work to my classmates.
B. I don't like to show my work to my classmates.
14. A. If my team were leading 7 to 3 when I was called in to pitch and my team lost, I would be unhappy.
B. If my team were trailing 7 to 3 when I was called in to pitch and my team won, I would be happy.

15. A. After summer vacation, I am glad to get back to school.
B. After summer vacation, I am not glad to get back to school.
16. A. I wouldn't want to be the worst player in a game in which three people were playing.
B. I would like to be the best player in a game in which three people were playing.
17. A. I like to recite in class less than other students.
B. I like to recite in class more than other students.
18. A. I would like to play golf or tennis.
B. I would like to play games with dice.
19. A. I like to recite poems in front of other people.
B. I don't like to recite poems in front of other people.
20. A. I don't like other people to say my work is poor.
B. I like other people to say my work is good.
21. A. I like to save part of the money I get.
B. I like to spend all the money I get.

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FOOTNOTES

1. Tests of the significance of differences are accomplished using 2x2 chi square tables, employing Yates correction for continuity when expected Ns are less than 5, or the Fisher exact test when Ns are very small (see tables prepared by Finney, D. J., *Biometrika* 35, 148 (1948), and Latscha, R., *Biometrika* 40, 74 (1953)). The probability levels reported are for two-tailed tests of significance unless specifically indicated as one-tail tests of predicted differences.
2. Recent evidence reviewed by Sarason (1960) suggests that Test Anxiety may enhance certain types of achievement-oriented performances when a "cautious" (or somewhat inhibited) approach to the task heightens the chance of success. We may, in other words, be in error when we assume that the disposition measured by the Test Anxiety Questionnaire, in dampening positive interest in achieving, always functions to produce a decrement in achievement-oriented performance. Our use of the Test Anxiety Questionnaire is guided by the theoretical interpretation of what this test measures presented by Atkinson and Litwin (1960) and in Chapter 1 of this report.
3. The degree of association between 9th grade intelligence and resultant motivation to achieve (n Achievement-Test Anxiety) is indicated by a contingency coefficient of 0.37 ($\chi^2 = 14.93$, $p < .001$).
4. In Table 2.3, all boys for whom both 9th and 12th grade n Achievement scores were obtained are included whether or not the measure of 9th grade intelligence was available. In Table 2.4 all boys for whom both tests of motivation were obtained in both years are included whether or not the measure of intelligence had been obtained. This accounts for slight discrepancies with the Ns stated in Table 2.1.
5. In subsequent comparisons between these groups there is some depletion in the Ns because not all measures were obtained for all subjects.
6. Since the correlation between average estimate of percentage of students having sufficient ability and prestige index was so high (-.90), it was possible to assign a level of difficulty to those stated vocational aspirations which were not included in our list. We did this by consulting the rating of prestige given that occupation in the NORC listing and the average estimates of difficulty obtained for occupations close to it on the NORC list. When this could not be done with confidence, the data were not included in the analysis of results.

FOOTNOTES (Concluded)

7. Extensive preliminary analysis of results showed that the major trends and differences were very comparable for boys and girls. For this reason, we have simplified the presentation of results by combining the sexes in the final analysis of results. Only Ss for whom both 5th and 6th grade scores on both tests were available are included in the analysis of performance.
8. All moderately motivated subjects were employed, whether or not they met the intelligence criterion imposed to sharpen the analysis discussed on page 93.
9. All Ss from whom the ARPS was obtained are included in Table 3.10.